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The Houston (Tex.) *Post* sarcastically proposes "rate-making by convention" as the future railway policy of Texas. It suggests this would be a better plan than the present one, of maintaining a commission, and having the legislature constantly interfere with the work delegated to it. The criticism is just. Regulation by commission, hampered and thwarted by regulation by legislatures, leads to the worst evils of both systems. The commissions seem naturally prone to deal rather hardly with the railways. They usually can be relied on to use as drastic methods as are required. In the course of their work, however, commissioners get knowledge and experience that warns them there are limits beyond which restrictions and burdens on the carriers should not go. If they know the legislature is apt to interfere they may overstep these bounds. If they do not overstep them, and the legislature, whose members usually know next to nothing about any phase of the transportation business, comes in and undertakes what the commission has refused to do, the results may be worse than if the commission had been less conservative. There is only one wise course, and that is for the legislature to confer on the commission such constitutional authority as the public desires to be exercised, and then leave it a free hand, under the control of the courts, to exercise its powers. The most ill-equipped, inexperienced and even unfair commission, representing the entire state, is pretty sure to handle more wisely and justly the hard, complicated problem of railway regulation than perhaps 200 men, each representing only a small part of the people, and each log-rolling for his little constituency, regardless of the interests and rights, either of the concerns regulated, or of the rest of the public. The bane of railway regulation is the ignorant, selfish, petty views of those who seek it, of those who exercise it and often of those who oppose it. It is a big subject that ought to be handled in a broad way by big men having the people of not less than a state, and preferably of the entire nation, for their constituents.

LISTENING TO INVENTORS.

The annual report of the Block Signal and Train Control board, printed in these columns January 15, shows no direct good results from its conscientious labor. Its indirect results and advantages are material and may be considered later. The board examined 371 devices; concluded the examination of 184; found only 12 of enough merit to warrant even an inquiry; and of these only four which were in the hands of proprietors who had the knowledge and the energy to install their apparatus. Reducing still further, only one was ready for a test.

This tells effectually the old story with which railway officers are familiar. Less than three-tenths of one per cent. of the block signaling devices submitted last year were ready for experiment.

The Signal Board might have gone farther and reported the truth, that the principles involved in every device submitted to them were either:

1. Of a class already well-known; and which has been examined by many practical railway men and virtually rejected as not promising any substantial improvement in the safety of railway traveling generally.

Or, 2, those embodying "wireless" and other chimerical schemes which, while very interesting from a mechanical or electrical standpoint, do not offer any practical advantage over the simple devices already in use in connection with automatic block signaling on all our principal railways, or over plans already well enough known but known to be useless.

Although the direct result is a "water haul," catching no fish, the lesson to inventors, who spend money and time in attempting to improve arts with which they have no practical acquaintance, should be an effective one. The Board is competent and dispassionate; it has been painstaking and judicial; after a year's work it has found nothing to recommend. And yet, the strongest reason for its establishment was the long-continued charge and accusation that railway officers refused to investigate new and valuable inventions, and that signal companies belittled them, bought them up cheaply and suppressed them.

Another indirect result of the Board's existence is the time saved by railway men. These 371 inventors would have cost many officers both time and stress in more or less painful interviews. The Board reports that: "Inventors often are exceedingly persistent, and some of them, sorely disappointed at the unfavorable decision, return again and again." The chance of the railway officer to refer these applications to an expert organization is not simply a relief of his burden, it is to the money advantage of the inventor who can get a quick, unbiased, and probably in all cases a final judgment.

Government interference is not sought by earnest and capable workers; scientific investigation by government boards is of the highest value to inventors, manufacturers and users, as is shown by this report of the Signal Board, by the Ordnance Department tests of steel, and by the work of the agricultural and other departments.

The work may well be extended to other railway safety appliances.

WANTED A DIPLOMATIC CORPS.

We had occasion, week before last, to pay our editorial respects to what we called the claim-department type of relations between a railway and its customers; the characteristic claim department idea, simply expressed, being to pay the man who has a loud voice, and to weary and harass the man who has not a loud voice. We made the point that the kind of public feeling which this sort of thing engenders costs money, and that it is always going to cost money. We are inclined to think that the supposed difficulty of getting public relations on a really friendly and constructive basis is very much exaggerated. We believe that the experiment has never really been tried in a broad and efficient manner.

Even the least of governments, the smallest of principalities, has an army to invade and to repel invasion, and a diplomatic corps to economize the use of the army. Now, a railway has a good many points of analogy to a government in its public relations, except that its governing is considerably more real and tangible to the citizens than that of the average principality, and that it is a government which the people at the present time are singularly prone to overthrow.

The railway also has its army to invade and repel invasion, with an operating division, an engineering division and a law division, of which the claim department is a brigade. It has need especially of defensive forces, because it is a very curiously shaped kingdom, being 1,000 miles long, let us say, and 100 ft. wide, and wholly surrounded by other principalities which may or may not be friendly. The internal affairs of this railway kingdom are very ably conducted, but it has also external affairs constantly to consider. Strange to relate, it has no diplomatic corps to cope with these affairs.

The principality of Monaco, surrounded by the French department of the Alpes Maritimes, excepting on the side towards the sea, contains about eight square miles of territory. It has an army of 126 men and a well organized diplomatic corps. The railway principality, 1,000 miles long and 100 ft. wide, occupies about 19 square miles of territory; it has a strong army, but no diplomatic corps whatever. Does not everybody recognize that the tendency of armies is to get governments into trouble, and that the function of diplomatic corps is to prevent them from doing so? Yet the railway principality provides itself with the army but neglects the diplomatic corps—has been doing so, in fact, for a great many years. Do the results need any explanation?

It is fair to say that the railway principality does a good deal of diplomatic adjusting in an informal way. When W. J. Harahan was assistant manager of the Illinois Central Railroad he made frequent trips over the line in his car and at all times paid the closest attention to the popular murmurs or rumblings which he heard along the route. If the division superintendent at Mattoon, Ill., brought in a local paper with sarcastic comment about late passenger trains or about slow delivery of shippers' freight, Mr. Harahan would conduct a first-class investigation of the situation and would try to correct the difficulty at once, and thus to stop complaints by removing the cause of them. This kind of work is being done, more or less spasmodically, all over the country. In a similar way the traffic department is constantly straightening out minor tangles which occur, but its ability to prevent the same causes of dissatisfaction from arising again is none too great.

Suppose, for the purpose of illustration, that a great railway should appoint a vice-president in charge of public relations; a man of mature years and judgment, skilled in railway affairs and human affairs as well, and carrying enough weight in the councils of his company so that his suggestions would be apt to be carried out. Suppose he were to devote his entire time to a first-hand study of local conditions in every community directly served by the railway, with a view to heading off causes of unpopularity as fast as they might appear, and to discovering, from a point of view a little less obscured by official duties than that of the president or the general manager, the kind of service which the railway was really giving its patrons, and the way in which that service could be performed better and existing friction removed. Such a man would be neither a traffic officer, a legal officer nor an operating officer, but would be in some measure a combination of the three in his active work.

Would not such a vice-president earn his pay? We believe that he would, and we shall welcome comment and discussion on this subject from our readers.

RECUPERATIVE POWER OF RAILWAYS.

Analyzing a table compiled by the *Wall Street Journal* of prices of stocks during 1907 and 1908 it will be found, in round numbers, taking highest and lowest quotations, that during the panic year 1907 the stocks of 119 railway companies which on their "high" mark stood for $6,480,000,000 lost in depreciation during 1907 the sum of $2,470,000,000 and in 1908 recovered all but $19,000,000 of it, or $2,451,000,000. On 140 stocks not railway representing at high mark $4,792,000,000 the loss in 1907 was $2,287,000,000 and the recovery in 1908 was $1,872,000,000, thus lacking $415,000,000 of complete recovery as contrasted with only $19,000,000 in the case of the railways. Wall street returns in such compilations are, of course, to be taken with salt and a speculative potential is to be remembered though it cannot be accurately reckoned in. Still the truism is to be recalled that the average guess of "the street" as to average stock values extending over a moderate period of time is a surer credential of actual value than that of the individual unless he happens to be an insider of a particular stock or group of stocks; and so far as upward speculation bears on prices it is apt to affect the shares of the railways less than those of other corporations, and the same is true of bonds.

As indexed by prices this high recuperative power of the railways of the country—a recuperation both absolute and relative—is extremely significant and cheering, and the more so as it is holding its own against some obstructive forces. Even the optimist need not hesitate to name them. In the immediate foreground is tariff revision. Legislative railway baiting by new law is probably near its end, but we have yet to see what the administration of recent laws is to be at the hands of commissions clothed with fresh powers. There is a residuum of uncertainty as to the attitude of the next administration toward the railways. General business of the country as reflected in railway earnings has improved steadily but it has also improved very slowly, and prices of railway stocks have outrun earnings gross and net. The optimistic—by which adjective we do not mean the speculative—sentiment of "the street" is thus ahead of conditions immediate and visible. Why then have the railways by the test of pretty firm prices so made good?

In the first place there has been the deepening belief of the investing public in the stability of railway property attested, for one thing, by the great increment during the last twelvemonth of the number of stockholders especially in the dividend paying lines. Hard times bowl over a particular group of investments and shake confidence in them; but if they survive the hard knocks investment confidence reacts very strongly in their favor and proportionally to the severity of the ordeal through which they have passed or seem likely to pass. This, essentially, has been the "panic" history of the American railways with the last panic repeating, with variations of its own, the story of earlier panics. Some weaker lines, as was sure to be the case, have had to go to receiverships. But as a whole the railways of the land have adapted themselves wonderfully to adverse conditions and have demonstrated flexibility—the investment that can bend but does not break. The drop in gross earnings a year ago was dramatic and startling; but not less impressive, although slower, has

been the reduction of operating charges by which the companies have met the storm. Nor, probably, does investment opinion go astray when it finds in the lower basis of operating charges the easier adjustment to conditions when business fully revives; when it finds that, with all its misjudgments, the anti-railway law-making of the past two years has trended in at least one sane direction—publicity; and that, coupled with exposures, it has made high finance in railways, if not impossible, at least much more difficult and perilous.

With such reasonings fixed in the mind of the average railway investor of the conservative or moderately conservative type and through him reflected on market valuations one does not have to seek ulterior causes—such as basic resources of the country and her industries, "cheap money" on good crops sold high—to understand how, by the test of price, the recuperation of the railways has been so striking. The test figures may be too high and may recede. That depends upon concrete returns of traffic, which are a better touchstone of value than the ups and downs of the street. But the street's valuation, the consensus of opinion of a host of investors reduced to its average has its own deep meaning, is the standard to which the ordinary railway investor must perforce appeal and which, if it does nothing else, with its enhancement of railway values enhances also railway credit, the upward movement of which has been so impressively shown by the increased sales of railway bonds.

HIGH POWER MILLING MACHINES AND CUTTERS.

The power consumed by an efficient machine tool is a fair measure of the work accomplished in removing metal, and the total power used in a machine shop may be taken as a rough indication of the shop's output, so far as the machining of metal is concerned. The great progress which has been made in locomotive shops by the use of direct-driven motors, improved designs of machine tools and high-speed cutters may be indicated by the fact that twenty years ago a belt-driven shop 300 ft. long and 60 ft. wide, equipped with all necessary tools for locomotive repairs, could be operated by two line shafts, each transmitting 75 h.p., while some modern locomotive shops have individual tools driven by 75 h.p. motors, and the consumption of power by some of them is as high as 100 h.p. In other words, two high-power machine tools are now using as much power as was formerly sufficient to drive all the tools in a good-sized locomotive machine shop, and the weight of metal removed per hour by the two tools is equal to that from all the tools in the old shop.

Some recent tests of slab milling show a consumption of 96 h.p. in driving one cutter, and the amount of metal removed is so far in excess of previous performance that it calls for radical improvement in the design of milling machines. The milling machine has not been used extensively in locomotive shops because the amount of metal removed was limited by the low efficiency of the cutters, and milling machines could not compete with planers, even with their disadvantage of cutting only on the forward stroke. The efficiency of the milling cutter has been so improved recently that it is now possible to force it to large output, and this gives new and large possibilities in the development of milling machines which will make them more active and successful competitors with planers; and they will find a larger field for usefulness in the regular equipment of locomotive shops.

The shape of the cutting edge of lathe and planer tools has been in the past five years the subject of elaborate experiment and scientific investigation, and this has resulted in a large increase in the efficiency of these tools. The milling cutter, especially that intended for heavy slabbing and using an inserted blade, has been working under the difficulty of wrong design, and the output of heavy milling machines has been limited by this inadequate capacity of the cutters. The mistake appears to have been made in using a straight blade, which can have a correct cutting edge at one point only, but the irregularity of the front slope causes the cutter as it advances to drag on one side and gouge on the other, causing a chattering which soon limits its capacity.

It required such a modification in the shape of the blade as would throughout the whole revolution present an efficient cutting edge similar to that obtained in lathe and planer tools when correctly formed. To maintain the proper slope and lip angle throughout its entire length the blade must be bent to form a helix, and there is then obtained a continuous cutting edge with a constant lip angle throughout any length of cutter.

In 1905 C. D. Peck at the Pittsburgh Locomotive Works developed a milling cutter with inserted blades made of high-speed steel and helical in shape. The amount of metal removed in a given time by this cutter in heavy slab milling was far in excess of those in general use, and the power consumed per cubic inch was reduced. Mr. Peck also demonstrated that the capacity of the inserted helical cutter made of high-speed steel was in excess of the high-power milling machine as made at that time. The further development of this cutter was described in a paper presented at the December, 1908, meeting of the American Society of Mechanical Engineers by Wilfred Lewis and William H. Taylor. In addition to the consideration of the correct form of the cutter, the paper describes the details of manufacture and method of fastening the blades by an alloy which cools without shrinkage and will resist heavy crushing loads without crumbling. By compressing the alloy in the slots the blades are secured to an anchorage so rigid that they may be broken off by sheer force without affecting the fastening. This method of securing the blades permits of the use of a large number of blades in a cutter of moderate diameter, a milling cutter of 8 in. in diameter having 18 blades. The paper contains a report of tests made to determine the capacity of the improved helical cutter and the power consumed per cubic inch of metal removed. It calls attention to the importance of the cooling liquid, or lubricant, as it is there called. The heat generated by the pressure of the chip is the chief cause of wear, and if allowed to become too great it will soften the lip surface of the blades and make them crumble off. An ample supply of liquid during the milling operation carries off the heat and materially lessens the dulling of the cutting edges. The stream should fall at slow velocity and be thrown directly on the chip at the point of removal.

The tests reported show, in results obtained in slab milling a cast iron block 15 in. wide with the Taylor-Newbold high-speed steel milling cutter, 8 in. in diameter and 18 in. face, in taking a cut ½ in. deep and 15 in. wide, the table advancing 7¾ in. per minute and the cutter speed 53½ ft. per minute, that 58 cu. in. of metal was removed per minute with a consumption of 1 h.p. per cu. in. With a cut on the same block 1 in. deep, 105 cu. in. were removed per minute with a consumption of .85 h.p. per cu. in.

In slab milling .30 carbon steel, with the same size cutter, the average amount of metal removed was 45 cu. in., and the maximum 63 cu. in. per minute. In a cut ⅜ in. deep and 18 in. wide, with a speed of cutter 75½ ft. per minute, the rate was 47¼ cu. in., and the total power consumed 96.5 h.p., at the rate of 2.04 h.p. per cu. in. removed. In channel milling, like the fluting of locomotive side rods, made of .35 carbon steel, tests were made with a cutter 4⅜ in. face and 8 in. in diameter. With a cut of $1\frac{5}{16}$ in. deep the rate was 28.7 cu. in. metal per minute, with 1.77 h.p. per cu. in.

For heavy slab milling of locomotive rods machines are now built which are driven by 65 h.p. motors and remove metal at the rate of 70 cu. in. per minute, and this may be taken as the best performance thus far obtained in the finishing of steel forgings for locomotives.

In the improvement of milling machines accurate tests made by electrical devices show that the efficiency of the

driving mechanism has been increased to 75 per cent., the feed efficiency to 20 per cent., and the efficiency of the cutters as above described is now such as to require the removal of 1 cu. in. forged steel per h.p. as a regular performance.

THE FULTON BILL.

On December 4, 1907, Senator Fulton, of Oregon, introduced the bill now well known, providing an amendment to Section 6 of the Act to Regulate Commerce, to the effect that no change should be made in the rates, fare and charges published by any common carrier, except after 30 days' notice to the commission and to the public, and that at any time during the 30 days any shipper might file with the Interstate Commerce Commission a protest against the increase, in whole or in part, the effect of this protest being to continue in force the existing rates until the reasonableness of the rate proposed to be substituted for the existing one should have been determined by the commission. Briefly, this meant that a single protest would defer a change for an uncertain and protracted period of time, regardless of the rights of the case, and that the rate-making power would be taken away from the railways. The protest custom, once well established and generally understood, it is hardly conceivable that any rate could be raised without finding the single objection needed to block the action.

It will be remembered that this bill slumbered a long time in committee, in spite of the earnest efforts of its sponsor to get it out, and that on January 6, 1909, largely through the efforts of the Railway Business Association, Mr. Elkins reported the bill adversely, and it was placed on the calendar.

On January 18, 1909, Senator Fulton reintroduced the bill in amended form, the amendment providing that the commission shall have discretion to postpone an increase in rates pending a final adjudication of the protests, rather than that such postponement shall be automatic.

The important objection to this bill in the public interest as well as in the interest of the railways, can readily be set forth. After a protest to an increased rate, the commission would have to do two things; it would have to make enough of a preliminary investigation of the case to decide whether or not to issue a restraining order pending full investigation; and it would have to make the full investigation to decide whether or not the protested rate should be restrained perpetually from being put into effect. Recognizing these facts as incontrovertible, it will be seen that there are again two ways in which the commission could do this work. It could make a real investigation prior to the first restraining order, or it could issue the order on a very superficial examination of conditions, supplemented by its knowledge of existing conditions. This latter process, which we have taken some words to explain, may better be described by the five-lettered word "guess." In view of the fact that the commission is notoriously swamped with work at the present time, we see little reason to doubt that its action in the multitude of such cases which would come before it would have to be characterized by the shorter and easier way. Yet to restrain a rate from going into effect is just as important a judicial act during the period of restraint as a final decision on the rate would be. Changes in the rate fabric have often to be made quickly; in point of fact they are more or less constant. It is certainly fair to assume that few of these changes would escape protest, and that the commission would soon be far in arrears in its determinings and have little time left for any other duties. If this turned out to be the case, the railway would be left without recourse during the long period intervening between the preliminary hearing and the final hearing, regardless of the ultimate decision. This amounts to loss of the rate making power, and it would react just as strongly on the shipper and on the community as on the railway. By far the most important of all discriminations in American railway service are the discriminations between localities; the offsets which give one board or one district or one industry an advantage over another. The failure to advance a rate, or a group of rates, under certain conditions would inevitably bring about discrimination of this sort, and the discrimination would be of long duration, if determination of the case were to be held up to await the convenience of an overworked commission.

But the harm of Mr. Fulton's amendment to the Interstate Commerce law goes further than this. If railways are to be estopped from raising their rates without great formality, delay and hazard, they are not likely to be quick to reduce them to meet temporary conditions. A single example of this will suffice. Several years ago, at the time of a trade depression which was sharply felt, although much less acute than the present one, it was pointed out by the steel manufacturers that, given a very low export rate to tidewater, they could dispose of their surplus products in certain foreign countries at a small margin of profit and keep the plants running. The fairness of this was apparent and an extraordinary low rate on export steel was given them, which moved an enormous tonnage to tidewater and kept the mills open. It is safe to say that it would not have been given them under the conditions which would exist if the Fulton bill became a law. Great Britain has suffered for many years from the inflexibility of its rate structure; in this wide country of ours, the hurtfulness of rate inflexibility would be almost proportionate to the area, and all persons interested in our best commercial welfare would oppose with all their mights this easy kind of law making, the importance of which is probably grasped only by the smallest fraction of the legislators who enact it, while the harm of it continues unchecked for long years.

NEW PUBLICATIONS.

Die Dampflocomotive der Gegenwart. Von Rovert Garbe, Geheimem Baurat, Mitglied der Kgl. Eisenbahndirection Berlin. 500 pages, 388 illustrations and 24 plates. Berlin, 1907. Julius Springer. Price, $6.

In the preface the author of this valuable work on the present status of locomotive construction clearly states the object of his book. This object is to set forth the advantages to be attained by the use of highly superheated steam in locomotives, in simplicity of construction as well as economy of operation, as compared with locomotives using saturated steam. While his general theme is the locomotive of to-day, his particular topic is the locomotive using highly superheated steam.

Trials with this type of locomotive were taken up by the Prussian State Railways in 1898, largely on the recommendation of Garbe. In collaboration with Wilhelm Schmidt he has been actively engaged in remedying the defects brought out by actual operation, and the success of their joint work is shown by the number of superheated steam locomotives in use at the present time—upward of 2,700.

In recent years the increasing demands of traffic on the power of locomotives has led to a great increase of boiler dimensions, and this in turn to weights of the entire machine in excess of those necessary to secure the adhesion required. For heavy and fast service the compound engine has in many cases taken the place of the simple engine, the increased economy offsetting the more expensive complex construction and costlier maintenance. These were the conditions that obtained at the time of the introduction of the superheated-steam locomotive.

In view of the economies resulting from compounding high pressure saturated steam, it was natural that similar results should be aimed at by applying this principle to superheated steam. In the author's opinion this is not to be recommended in connection with the locomotive; he considers it a mistake, and besides devoting a chapter to its discussion, frequently recurs to it in other parts of his book to point out the lack of satisfactory results.

Based on numerous experiments and on extended experience, Garbe gives 100 deg. C. (180 deg. E.) as the lowest

degree of superheat that will approximately superheat each particle of steam and impart to the body of the steam the properties of a true gas. For steam of this and of higher temperatures he uses the term "hot steam." Using hot steam in the properly proportioned cylinders of a simple engine, a cut-off of 20 per cent. with 45 lbs. initial pressure still gives excellent indicator cards, and with 40 per cent. cut-off the engine exerts its maximum hauling power at the average speed for which it was designed. The economy of the compound over the simple engine, both using saturated steam, lies in the better utilization of high pressure in the former and the smaller steam condensation, which is reduced from 35 per cent. to 25 per cent.-20 per cent. The economy of the hot-steam locomotive is not dependent principally on high steam pressures, it is due to the fact that highly superheated steam is a thinly fluid gas, a poor conductor of heat, behaves in the cylinders, even under much throttling and with short cut-offs, like a permament gas, and that in a simple engine there is no condensation. To secure the advantages inherent in hot steam by using it in a compound locomotive, it would be necessary to avoid steam condensation in the second cylinder as well as in the first. To achieve this it would be necessary to lengthen the cut-off of the high-pressure cylinder to 60 per cent. to 70 per cent., which would result in raising the mean temperature of the walls of the cylinder to such a degree that lubrication would be difficult and the cylinder endangered. Moreover, highly superheated steam would enter the low-pressure cylinder, which that cylinder would not be able to stand. Even with its greater efficiency the compound locomotive has not prevailed over the simple, both using saturated steam. The increased efficiency of the hot steam as applied to locomotive is an established fact, and by its use the means are furnished to entirely abandon the principle of compounding in connection with locomotives and to return to the simple construction. Trials have shown that to develop the same power it consumes from 25 per cent. to 20 per cent less coal and 50 per cent. to 30 per cent. less water, according as the comparison is made with an ordinary simple or a compound. In comparative tests with three locomotives, a simple hot steam, a simple and a compound using saturated steam, all three burning the same amount of coal on the grates, the first shows an increase of hauling power of 70 per cent. over the second and of 40 per cent. over the third. High superheating therefore furnishes the means of satisfying the increasing demands for higher speeds and greater hauling power by the use of a simple engine, without enlarging the boiler dimensions or those of the locomotive. The bearing of these economies on increasing the length of run of an engine without taking on coal or water is evident.

From the foregoing it will be seen that the author champions the exclusive use of the simple engine in connection with hot steam. To establish this contention he devotes an entire chapter, besides referring to it repeatedly. It is hardly necessary to say that not all designers are in accord with him. This is shown by the hot steam compounds that have been built during the last years in Europe. These have been designed for special services, and in course of time their records will show whether they have a reason for existing.

The subject matter is divided into two parts: I. Locomotives using saturated steam, 180 pp. II. Locomotives using hot steam, 312 pp. The diagrams, plates and tables of tests, etc., are excellent and valuable.

Part. I A general description of the characteristics of the construction, dimensions and efficiency of American locomotives precedes a detailed description of some of the most noteworthy examples. This is followed by a similar description of prominent and characteristic European locomotives. A chapter is devoted to the salient features of recent constructions, and this part ends with an account of American methods of building locomotives based on the author's observation during a three months' visit in 1904. His criticisms in this connection are of interest.

Part II. Attention is called to a use of superheated steam for power in 1832 and to the unsatisfactory results of trials in the navies of the United States, England, and France in the early fifties. The lack of success in these as well as in subsequent trials was due not only to faulty constructions, but also to the inability of organic lubricants (the only ones at that time available) to stand a higher temperature than 250 deg. C. (482 deg. F.). It was the production of American mineral oil lubricants of high burning points that made it possible to use highly superheated steam in the engine. In its practical application Wilhelm Schmidt was the pioneer. He recognized and demonstrated the economies resulting from its use, designing and constructing a superheater which today, in its later development, is the one generally employed. Based on satisfactory results with stationary engines, the Prussian State Railways in 1898 built two express locomotives for superheated steam, the specifications being furnished by Garbe. These were put in service, and in spite of defects, since remedied, they showed a marked increase in efficiency and are still in use.

The scope of this part is best shown by the headings of its subdivisions:

1. The behavior of superheated steam as a source of energy.
2. The simple hot steam locomotive and the four-cylinder compound with moderate superheating.
3. Superheaters for locomotives.
4. The steam engine of the hot steam locomotive of the Prussian State Railways. (Details of construction.)
5. Tests and operating results of the hot steam locomotive.
6. The hot steam locomotive of the Prussian State Railways.

The presentation of the characteristics of saturated and of superheated steam, together with their behavior as vehicles of power, bringing out the importance of a high degree of superheat, is followed by a discussion of the principles that are to be observed in the construction of heaters to produce uniformly superheated steam, the influence of hot steam on the dimensions of the cylinders, together with various points of importance in connection with the saving of fuel and water, and the resulting increase in efficiency. The next chapter is devoted to the main contention of the author, that there is no advantage to be gained by compounding hot steam and that the engine of the future is the simple engine using hot steam.

The remainder of the book treats of the structural details of the constituent parts of the hot steam locomotive, tests and operating results. It contains a mass of information of great value not only to the builders of locomotives but also to the operating department of railways. Of particular interest to the latter will be that owing to the greater range of economic working the Prussian State Railways have, in the case of hot steam locomotives, been able to make a considerable reduction in the number of classes of locomotives needed to cover the requirements of their service. They have adopted for this purpose the following eight classes:

I.	4-4-0	Express	locomotive	78	in.	drivers
II.	4-4-0	Express	"	82½	"	"
III.	2-6-0	Passenger	"	63	"	"
IV.	4-6-0	Express	"	69	"	"
V.	0-8-0	Freight	"	53	"	"
VI.	0-6-0	Tender	"	53	"	"
VII.	2-6-0	"	"	49	"	"
VIII.	0-10-0	"	"	53	"	"

The entire work is one of the most valuable that has appeared in recent years on the subject of which it treats, and is the only one that thoroughly discusses the merits and construction of the most recent member of the locomotive family —the hot steam locomotive. E. F. E.

The Design of Highway Bridges. By Milo S. Ketchum. New York: *The Engineering News* Publishing Co. 144 pages; 6 in by 9 in.; 308 illustrations. Cloth. Price, $4.00.

This book is intended to be supplementary to the Design of Steel Mill Buildings by the same author. It will be an ac-

ceptable addition to the library of the designing engineer, especially in view of the paucity of works on the subject of highway bridges, despite the fact that railway bridges have been so extensively discussed and written about. The book before us is essentially a book for the student, not necessarily a student in a technical college, but a student in the sense of one who studies. It offers a brief course in the calculation of bridge trusses which is followed by a systematic discussion of the problems involved in the design. In a way it is elementary, in that it attacks and explains the first principles of calculating such stresses and yet in order that it may be followed intelligently it pre-supposes some previous knowledge of the theory of stresses but as to just how much it is difficult to say.

The opening chapter presents a series of descriptions of the several types of bridges that are in use and this is followed by one on loads and weights. This chapter contains some very interesting and valuable diagrams to be used in the preliminary estimates of the weights of bridges in order that the first estimate of stresses can be made before the details are worked out. In the third to eighth chapters there is given a short but exceedingly clear demonstration of the resolution of forces in the determination of stresses in the various types of structures that are under consideration. In this some preliminary training will be required for a complete understanding of the work, but to any one who has had this training the problems and their solution will be a simple matter to follow. Then comes a series of practical problems in the form of exercises that are to be worked out under the guidance of the text. The method pursued is to state a problem, giving the length of span, the type of truss, its depth, and dead and live loads per lineal foot. This is accompanied by an outline of the method to be pursued in the solution of the several stresses such as those that occur in the chords, webs, floors, etc. These problems cover work on the Warren, Howe, Pratt, Baltimore, Whipple and camel back trusses, several examples being given for each and all accompanied by diagrams of a typical case. The details of construction receive a large share of attention and this discussion of the details includes the piers and abutments with a chapter on the erection and estimates of weight and cost. The book is profusely illustrated, not only with diagrams of the structures under immediate consideration, but with reproductions of photographs and drawings of bridges that are in use.

While the book is intended chiefly for the use of the designer and student of steel bridges it also deals with stone, concrete and reinforced concrete bridges as fully as the limited space of a single volume will permit.

Letters to the Editor.

RAILROAD EMPLOYEES' AND INVESTORS' ASSOCIATION.

South Chicago, Ill., Jan. 5, 1909.

To the Editor of the Railroad Age Gazette:

Of the many agencies at work in the interest of industrial peace and prosperity none has chosen a more advanced and consistent basis of action than the Railroad Employees' and Investors' Association. In this movement is reflected the progressive spirit of the age and the need of the hour. Its formation adds a chapter to the railway history of America of greater interest and more importance to railway labor than is contained in the long record of needless and destructive warfare between employer and employee.

Ten years ago the writer, in an article published in this paper, expressed the opinion that "so long as the owners and operators of railways remained in hostile camps the interest of both must continue to suffer and be sacrificed as a penalty for outraging the laws of common sense and sound business methods." In this same article it was shown that as the scope of antagonism broadened between employer and employee the hardship and suffering of both increased.

While this new movement is misunderstood by many, and misrepresented by some, it is a cheering sign of the times that these two closely associated interests have at last concluded to heed the imperative duty of correcting at least some of the long continued abuses that disturb the railway household and weaken the entire structure.

As producers of transportation railway employees are interested in the market value of their product. The present great public clamor against the railways has for its basis the desire of the consumers of transportation to buy the product as cheaply as possible, and in many cases for less than the cost of production and without regard to how it would affect the more than a million and a half of men and women engaged as producers. For this, if no other reason, railway employees can with profit turn their attention toward this new association and give it hearty support, as in this way they can strengthen their positions as wage earners and bread providers.

F. J. O'Rourke,
Switchman, C., L. S. & E. Ry.

FOR INCREASED MISSOURI RIVER TERMINALS.

St. Joseph, Mo., January 26, 1909.

To the Editor of the Railroad Age Gazette:

With the restoration of normal industrial conditions and the general revival of business in the West, the volume of trans-Missouri traffic promises soon to reach the high level of the period immeditely preceding the "slump" in the latter part of 1907, but with this difference, that in 1907 was reached the crest of a series of record-breaking years in the movement of freight traffic, while the coming revival will, it is predicted, mark the beginning of a gradual increase to greater proportions than ever before.

These predictions coming true, the railways and the shippers of the Central West will face a problem of vast consequence to them—the problem of expeditious and economical handling of freight.

In this article especial reference is had to traffic crossing the Missouri river, in either direction, in the lower district, and to the concentration which of necessity ensues from interchange between roads at the principal gateways—in other words, to the important matter of terminal facilities at these centers.

The freight producers of the West are keenly interested in the question of how the railways are to meet the shipping demands of the future. Looking backward not more than ten years, and comparing the volume of trans-Missouri traffic of the present with that time, and noting the remarkable increase, then looking ten years ahead to the probable growth, no stretch of imagination is required to foresee this business doubled in volume. Recalling also to mind the congestion, delays and losses suffered for months prior to the slump referred to, it seems none too early to consider how the carriers are to provide for the calls of the future upon their facilities.

St. Joseph, the central gateway in the lower group of Missouri river cities, is well situated, geographically and physically, for terminal and interchange development. Six of the western trunk lines now enter this city, and six more are within 30 to 60 miles, and could conveniently gain access. The banks on each side of the river are high, and above danger from overflow. A large acreage of terminal property is available that could be secured and improved at comparatively low cost, and terminals so located as to be operated at minimum expense.

The correlation between all shipping interests is such that whatever would help or hinder one point would correspondingly affect other points. Therefore, this suggestion is not made in the interest of a single community, but for the relief of all the gateways—which are also important commercial centers—of all communities served by them, and of the car-

riers and the districts beyond which freight shipments must cross the river.

No more favorable time than the present will be afforded the railways to acquire new terminals or increase old ones at this point. St. Joseph is a city of well over 100,000 population and possessing extensive commercial and industrial interests, with every indication pointing to a rapid growth in these respects. In the course of events, property available for terminals and which might be secured now on low valuation, if not taken over for that purpose, will be devoted to other uses. Thus, the available terminal property will become limited in area and higher in price.

The shippers of this city and the entire West are greatly concerned in the matter of the prompt transportation of their goods. Good service is of such vital importance to them that the main question with them is how to co-operate with the carriers for better facilities. Congested terminals, interruptions in the movement of traffic and uncertain deliveries throw out of gear the machinery of industry, commerce and finance, and the losses entailed are incalculable. Closely following the losses to the shipping interests are those directly and indirectly sustained by the carriers from the same cause.

The time has come when shippers and the carriers should take counsel of each other for the well-being of all. The entire problem of rail transportation is a gigantic one, of which the matter of terminals in the principal and strategic centers is the most formidable. It is not sufficient that shippers merely call the attention of the carriers to their requirements and then, without offering a helping hand, sit by and ask that every provision be made to meet them. This is a joint, and should, in so far as the circumstances admit, be made a common cause between the patrons and the roads.

The business interests of St. Joseph, feeling, as they do, that advance preparedness is the surest safeguard against business losses through congestion and delay, and foreseeing the needs of the future, stand ready to render all possible aid to the railways in the development of terminal facilities at this gateway.

H. G. KRAKE,
Commissioner, St. Joseph Business Men's League.

WANTED; A DIPLOMATIC CORPS.

New York, January 27, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

Referring to the editorial in this week's issue, proof of which you have sent me, I believe that the principle enunciated is a correct one, and that the suggestion is most timely, as I believe that there is a better chance for the railways to get into more effective communication with the public now than has ever existed previously. I think that your simile in which will liken a railway to a country with its various departments of government is a most happy one and illustrates most clearly your point. I am disposed, however, to feel that diplomacy, such as you mention, would perform many of the functions of defense which the army performs in an ordinary state. In other words, I think that diplomacy in your figurative railway country is a more important factor than it is in an ordinary government. There is a question, however, of method, that is to say, whether or not the working organization should not be so constituted, and so trained, that it would perform the diplomatic functions rather than someone not connected with the working organization, as you suggest. The working organization, either in traffic or operation, or any other of the various departments, is in position to immediately accomplish those things that should be done to remedy improper conditions. It is true that each of these departments have charge of only a branch of the service, yet I believe with a proper general organization that each department will feel that it is its bounden duty to at once communicate to the others those things that they hear with reference to the other departments which might give rise to criticism. It is, however, true that there are certain local territories requiring particular attention in a diplomatic way, and these situations would have to be handled of themselves by men especially adapted to fulfill the requirements of such a position. This latter, in fact, may be true of an entire system of a railway, in which event I think that the suggestion made to appoint some one high in authority whose duty it will be to give particular attention to this character of work is the one which would be best to adopt. Considering the situation as a whole, therefore, it seems to resolve itself into what is the best method to adopt for each individual case. The principle, however, that there should be intimate attention paid to the relations between the railway company and its patrons, and intimate intercourse sought, should be carried out in a definite manner, and those arrangements made that are necessary to fully meet the requirements.

Even when a special man, such as is suggested, is necessary, I believe that the whole organization should be schooled to feel that their business conduct should be along the lines discussed. The best way to insure this is to direct the training of the men, particularly those men who are likely to be made officers, along these lines from their earliest start in railway business so that this will become a prominent feature in their mind.

Generally, it is only essential that the people should know the truth of railway affairs, and if we insure that they will know the truth in some manner, I feel that a good deal of antagonism will be avoided. We all know of instances in our recollection where simple statements in their transmission between many people become distorted until the original could not be recognized. I am sure that much of the bad impression that the people have received of the railways comes from the fact that many such distortions are always taking place. The best way to prevent such distortion is by such an arrangement that the people will receive as nearly as possible their information at first hand, so that imagination and deductions, which are also largely imagination, do not have to be the only means by which the public have to obtain such information.

My definition of the word diplomat, as herein used, would be one who has the ability to present convincingly the side of the railway on any mooted question, and in such a manner as will result in its obtaining its due, measured by the standard of ordinary business rules.

W. J. HARAHAN.

FLAGGING ZEAL.

New York, January 25, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

The Pennsylvania Railroad, in advertising its passenger trains, says to the public:

> The traveler, in the selection of his route, looks for the most securely protected line. The through trains of the Pennsylvania Railroad are drawn over a roadbed of recognized superiority by the strongest and fleetest of modern locomotives, protected by a signal system of proved fidelity, and their reliability is as nearly normal as unflagging vigilance can make it.

It seems to me that a statement of this kind calls for a protest. As a passenger on the night trains of the Pennsylvania, I should be only too glad if the vigilance of the trainmen had a little less flagging about it. This statement—that they are unflagging—is grossly deceptive. It is true that on most roads most of the time, and perhaps all roads some of the time, and on some roads all of the time, the flagmen do not flag. They are universally unflagging, so far as can be observed from the rear end of the train. But as regards the Pennsylvania, the Union Pacific and a few other well-managed roads, the statement is untrue. The flagmen flag hundreds of times daily (and nightly) when there is no need of it. A dozen times on a trip you will see them go back. Usually they go but a short distance it is true; but they go far enough to show that the company does not feel a sufficient sense of security in its block signals, for they do this when a semaphore signal as large as life *stands in plain sight* a short distance back. Usually the stop lasts only

two or three minutes, and the flagman comes back without putting down a torpedo.

Assuming that flagging is necessary or desirable, the most that can be said for this process, as usually carried out, is that the flagman *prepares* to carry out the rule. If there really is a necessity for protection, this necessity grows greater with each succeeding minute, yet the final minute, during which the flagman is returning to his train, and which is the most dangerous minute, is left without protection. To really protect, he would have to go back 100 rods and put down a torpedo, so that there would be some protection while he was coming in.

Constantly making this exhibit before passengers is looked upon by some superintendents as a good advertisement for a railway. It shows them what careful habits are inculcated by the superintendent. Another view, however, is that passengers will be made timid, instead of being reassured, when they see how little dependence the railway places on its block signals.

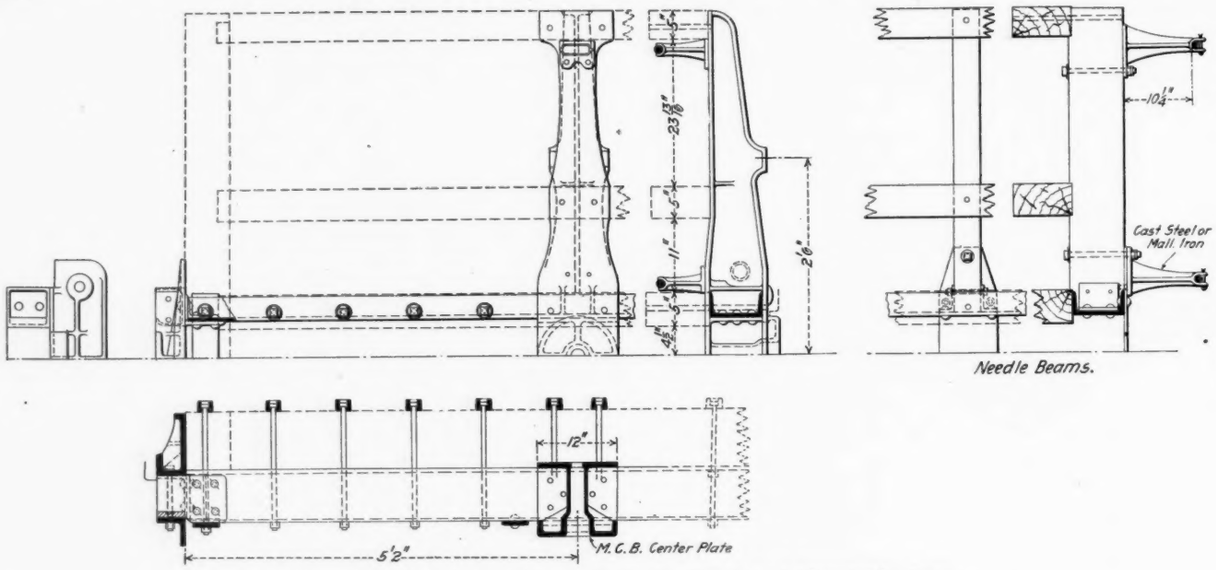
This question of the influence of flagging on passengers may perhaps be looked upon by you as academic; but there is another question that has a real bearing on human happiness if this hasn't; the question of the influence on passengers' peace of mind of the whistle-noise, which is used to call in the flagman. This is severely practical, especially at night. A passenger who depends, as many passengers do, on the noise and motion of the train to lull him to sleep in his berth, is quite likely to be awakened whenever the train has to make an unusual stop; and on the Pennsylvania the greeting that such a passenger usually receives after he has been awake a few seconds is the whistle-signal from the engine—four blasts—loud and not very short—calling in the flagman. Quite possibly the stop has been so short that the flagman has not gone back at all, but the whistle-signal is given invariably.

Let us hear from the literary artists of the Pennsylvania's press bureau on this phase of life on their superlatively excellent railway. This is not a mere growl from a grouchy country editor who has lost his Pennsylvania advertising; the disturbance to passengers which I have cited is a real defect that ought to be corrected. When the conductor goes through a parlor car on the Pennsylvania, punching the tickets, he scatters some of the punchings on the velvet carpet. Very soon the porter comes through with a dustpan and sweeps these up, thus removing what might offend the passengers' eyes. Why should not the company be equally solicitous to abolish all offense to the passengers' ears? S. G.

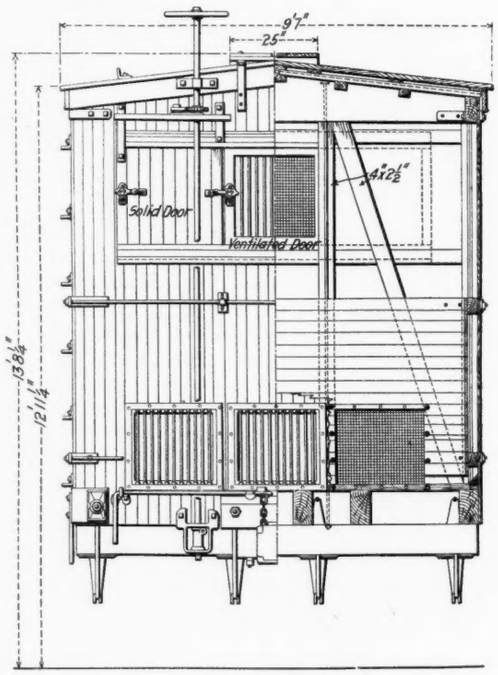
Contributed Papers.

FRUIT AND VEGETABLE CARS FOR THE SAN ANTONIO & ARANSAS PASS.

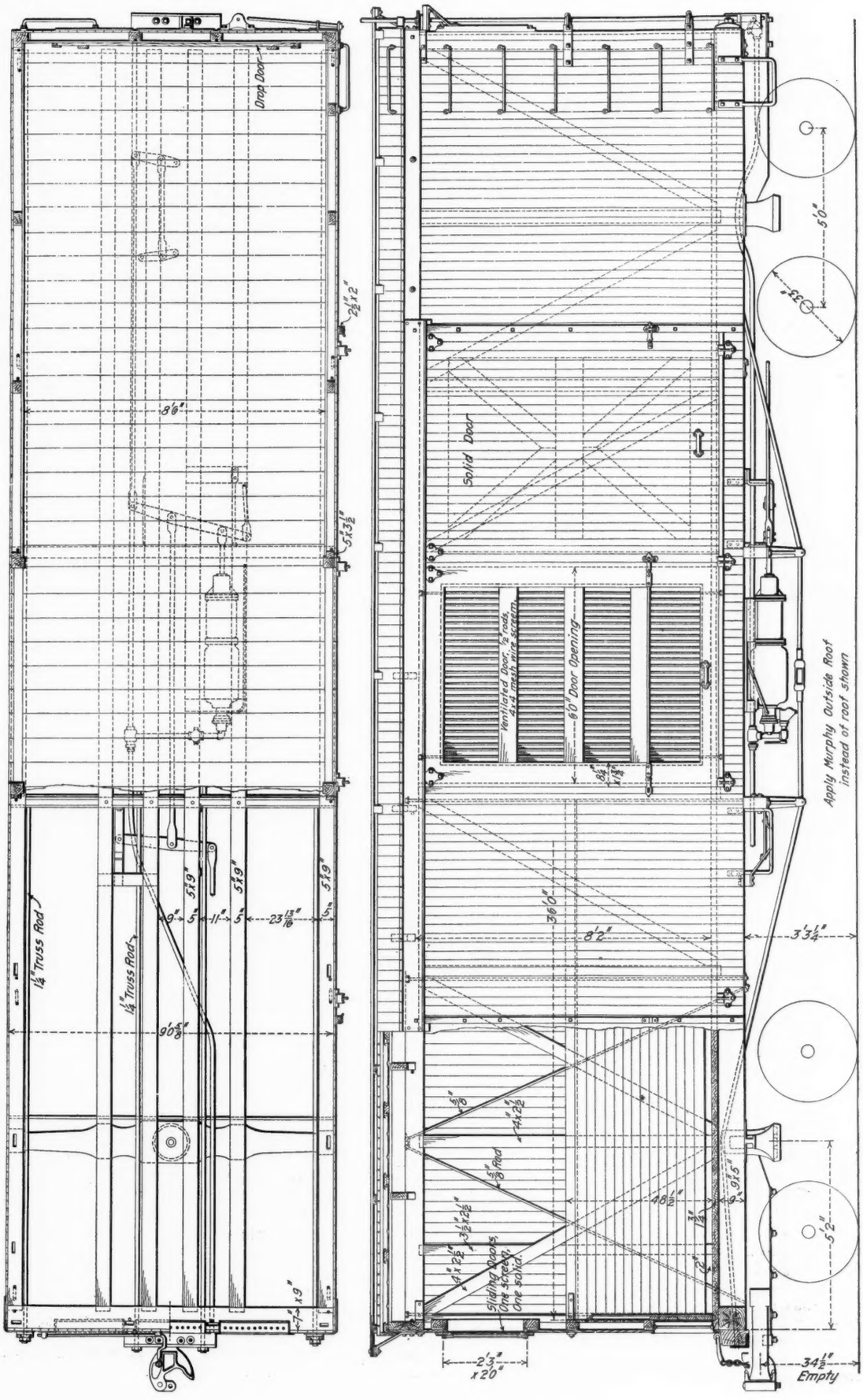
The San Antonio & Aransas Pass is having built by the American Car & Foundry Co. 500, 36-ft. thirty-ton wooden ventilated cars for fruit and vegetable shipments which contain some new features in the ventilating arrangement. This road has a considerable traffic from the truck-growing regions of Texas which it reaches. Truck growers complained that their shipments of fruit and vegetables were damaged from inadequate ventilation, no available design of ventilated car giving satisfaction in this respect. The San Antonio & Aransas Pass began a detailed investigation of the subject, experimenting with different ventilating arrangements and observing the effect on fruit and vegetable shipments as denoted by their



Details of Underframing; S. A. & A. P. Fruit and Vegetable Cars.



Half Sectional End Elevation.



Plan and Elevation of S. A. & A. P. Fruit and Vegetable Cars.

condition on arrival at destination. The arrangement here shown was finally adopted as one meeting the requirements of both the railway and shipper.

It will be observed that the lower end ventilators extends almost the full width of the car; also that the usual small side ventilators are omitted. It was found that these side vents caused the air currents from the end of the car to be deflected in such a way as to leave a part of the lading without air, hence their omission. It is said that air reaches every crate in the car in this arrangement, and that it is the best practicable plan for a car that is also to be used in general freight service. The frames of the lower end ventilators are made of solid malleable iron, which add strength to compensate for the cutting away of the siding for these openings. The end of the car is also stiffened by two horizontal truss rods, one about half way up, and the other near the bottom; the latter also serves as a handhold. Drop doors are provided for closing up and protecting the lower ventilator openings for shipments of lumber and other such materials, and to make them tight for grain shipments.

After the general drawings, reproduced herewith, were made, it was decided to apply steel draft beams, metal buffers, etc., to the cars. A supplementary drawing showing the details of these features was made, and it also is reproduced. The metal draft beams are 8-in. channels bolted to the under side of the wooden center sills to give continuous metal draft members, and also increase the efficiency of the car to load, a plan that is being used on other roads for light capacity wooden cars.

We are indebted to R. F. Peters, Mechanical Engineer of the San Antonio & Aransas Pass, for data for the foregoing.

REGULAR BILLING ACCOMPANYING OR IN ADVANCE OF TRAFFIC.*

BY W. H. NEWMAN.

The practice of receiving and forwarding cars on card bills, which is now being followed by some roads, is one productive of mny evils and should, I think, be promptly corrected. The necessity for such rules now is far greater than during the time prior to "Per Diem" being established.

Now that "Per Diem" rules are in effect and some lines have questioned the rule giving the right to make reclaim for "Per Diem" on cars that have been delayed awaiting regular billing, holding that inasmuch as it is the custom to interchange cars on card bills, no reclaim should be made, it makes it doubly hard on the innocent holding road.

Some roads decline to receive cars until furnished with revenue billing, which causes the intermediate road, who is in no way responsible for the delayed billing, to be the sufferer, not only on account of delay to the traffic, but in many cases perishable freight either has suffered a total or partial loss and had to be disposed of at a great sacrifice on account of inability of the intermediate line to make delivery to its connections, which would carry the traffic to its final destination, for want of revenue billing.

It is well known that the roads with scarcely an exception in what is known as C. F. A. territory have uniformly established rules, which are rigidly enforced, declining to receive a loaded car from any connection unless accompanied or they have been furnished in advance with revenue billing for such traffic, whilst in other territory their connections and lines with which they were daily interchanging business were receiving and forwarding traffic on card bills. Particularly in the South did these conditions prevail to a great extent some time back, but it is pleasing to note within the last twelve months a great number of the leading southern lines have established rules similar to those in effect in territory north of the river.

I think it will be conceded by all that when for some reason the line originating the business sees proper to let the car move on a card bill destined to territory to which the delivering and possibly intermediate lines refuse to accept unless furnished with regular billing and such traffic is delayed (in some cases suffering a total loss) at the junction point or yard, which not only adds to congestion, but requires considerable use of already over-burdened wires, it is manifestly unjust that they should bear this burden in addition to sometimes expense by loss and in all cases responsibility on account of delay to traffic, which has been held waiting for billing from original point of shipment.

Some roads claim that on account of large cargoes of fruit and other highly perishable freight being quickly unloaded at Coast points, and the yards not being of sufficient size to furnish storage for the entire cargo until such time as shippers could furnish billing instructions, they have to allow cars to go forward on card bills to be held at junction point or yard until such time as shippers could find markets for same.

Some officers have also expressed fear that in enforcing such a rule the traffic would seek other gateways. No well-founded objection has yet been advanced that could not be easily overcome if the rules were universally adopted. I hold the above objections only prove the great necessity of the rule being established, for as a matter of fact it would have the effect of preventing just what is claimed is feared, for the reason that no car would be moved from point of loading until revenue billing had been made, and the car being once started on its journey, its clear movement would be assured, which is not the case at present.

The failure to get uniform action of all lines on this subject is no doubt to a great extent due to the fact that it is a subject which affects both the transportation and traffic departments.

It is true that many times it occurs that the loading agent is not prepared to make revenue billing for the traffic at the time loaded, and sometimes it is days after the traffic has gone forward until billing is made due to the fact that he is waiting for instructions from the traffic department as to rate, divisions, route, or some other information that may be desired to be given by the traffic department. If for any reason traffic should be loaded at a point for shipment and the agent is not furnished with rates, divisions, routing or any other instructions, it is eminently proper that the traffic should be delayed with the originating line, which is wholly responsible, and it is a great injustice to intermediate and delivering lines for any initial line to load and forward traffic on a card bill, when it is a known fact before the traffic moves that it can not reach its ultimate destination until revenue billing is furnished. Unfortunately many agents do not realize the necessity of revenue billing being furnished and frequently are not energetic in getting proper information to make up billing after relieving their station of the traffic.

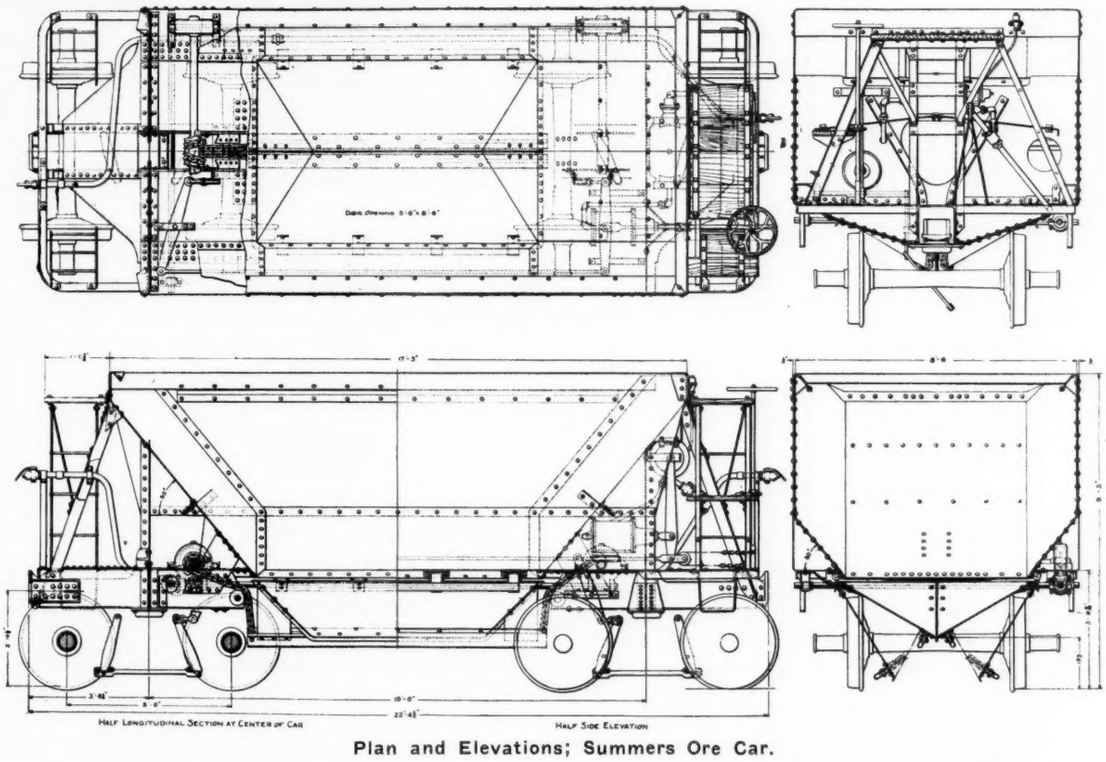
*A paper read at the annual meeting of the Central Association of Railroad Officers, Peoria, Ill., October 14-16, 1908.

The British Uganda Railway, from the Indian ocean at Mombasa west by north 584 miles to Lake Victoria Nyanza, during the year ending with March, 1907, carried 295,491 passengers and 59,118 tons of freight, which was an increase of 67 per cent. in passengers and 33 per cent. in freight over the previous year, and of 309 per cent. in passengers and 125 per cent. in freight over 1904-5. The progress is rapid, but the total traffic is still very light for a railway which has cost about $27,000,000. The gross earnings in the last year reported were $2,095 per mile, and the working expenses 68 per cent., leaving net $647 per mile. The passenger fare for natives was reduced from 1 cent to ½ cent per mile, which has greatly increased the travel from the sea for 300 miles inland, across the unhealthy plain; but there are still many natives who prefer to walk 300 miles to paying a farthing a mile; probably because they have no farthings, and no pockets to put them in if they had.

SUMMERS ORE CAR FOR THE DULUTH & IRON RANGE.

The Summers ore car is a self-clearing car that actually dumps all of the load. In the spring of 1908 a sample car, photograph of which is here shown, was sent to the Duluth & Iron Range Railroad for trial, which resulted in the placing of an order with the Summers Steel Car Company of Pittsburgh

General View; Summers Ore Car.



Plan and Elevations; Summers Ore Car.

for 800 cars for delivery early this coming spring. The cars as ordered have some slight changes from the sample car, but the general arrangement and operating mechanism remain practically the same.

The following are the principal dimensions of the cars ordered:

Capacity, 50 tons	820 cu. ft.
Length over dead woods	22 ft. 4½ in.
" face to face of coupler knuckles	24 ft.
" center to center of trucks	15 "
" inside of car body	17 ft. 5 in.
Truck wheel base	5 ft.
Height top of rail to top of car	9 ft. 5 in.
Width out to out of car body	8 " 7 "
Width inside of car body	8 " 6 "
Discharge door opening	5 ft. 6 in. x 8 ft. 6 in.

Two doors made of heavy pressed steel shapes close to opening, which extends over a portion of the inner truck wheels, the ends of the doors being flanged upward, which permits them to open downward without obstruction by the wheels.

The side and end sloping floor plates have an inclination of 50 deg. with the horizontal. The end floor also has its side portions turned up at an angle conforming with the side floor slope, with the result that the ore over the end floor plate is not changed in cross section, as it slides out until it reaches the door opening. The doors open downward to such a degree that the resultant angle between the side and end sloping portion of the door is 50 deg. with the horizontal. The top flanges of the side and end sheets also slope inward and downward at an angle of 50 deg. with the horizontal.

With the door opening so wide, both transversely and longitudinally of the car, as to break the bridging effect of the ore, the portion of the load over the doors immediately falls out when the doors are lowered, and this is followed with that over the side and end floors which are of such an angle that the load slides off.

Each door is supported at its outer edge by four heavy hinges, and at both ends by ¾-in. chains. These chains are attached to and wind around a steel drum on 2½-in. steel shafts which are held from rotation and are actuated by means of worm gears. These are at the side of the car, having a common shaft actuating both worms in unison. A cross shaft just back of the body bolster extends from side to side of the car and is geared with miter gears to the worm shaft; this cross shaft provides a means of operating the doors from either side of the car by the use of a crank on the end of the shaft.

The worm gears hold the doors in any position from closed to full open, requiring no other latch mechanism; this enables the operator to open the doors slowly and prevent the whole load from dropping out at once, which might, by its impact, damage the dock.

The present equipment of the ore-carrying roads in the Northwest requires the united effort of from six to ten men to unload a car, which is accomplished by a number of the men getting on top of the load and poking the ore out with iron bars, while others pound the car sides to jar the ore down. With the new car one man can discharge the load and close the doors inside of two minutes, and is not required to get on

the load at all. This will mean the difference between carrying on full operations during the rainy weather with the new cars, and only partial operation with the old ones, as men will not get up in the ore while it rains.

A peculiarity of the new car is the lack of center sills; the draft sills terminating at the door opening. The buffing and pulling shocks from the engine are transmitted to the sides of the car through horizontal side girders which are attached to the tops of the draft sills, and to the car sides, which sides have their lower portions formed into triangular shaped columns and take the place of center sills.

The steel corporation has for several years been using cars of similar construction about its mills for handling refuse materials. The excellent service and low maintenance cost of these cars cause confidence in the durability of the new ore car. E. W. Summers, president of the Summers Steel Car Company, is the designer and patentee of both the cars used about the mills and those ordered for the Duluth & Iron Range.

RESULTS OF THE MODERN APPRENTICESHIP SYSTEM.

The railway world is, or should be, fairly familiar with the apprenticeship system that has been in use on the New York Central Lines for the past three years or more. When the subject was presented to the Master Mechanics' convention in 1907 it attracted more attention and elicited a more animated discussion than any other subject on the program. At that time, however, it was more or less tentative, and its supporters were enthusiastic rather for what was expected of it than for what it had accomplished. The officers of the roads could only refer to the indications of a probable success, and there were but a few, a very few, who doubted that their expectations would be fulfilled.

While it is still too soon to look for a complete fulfilment of the early anticipations, enough time has elapsed to make it possible to obtain some results as an inclination of what is to come.

In a recent address before the Pittsburgh Railway Club, C. W. Cross, the superintendent of the apprentice schools of the New York Central Lines, gave a brief outline of the practical results obtained, and these are more than encouraging. After stating the general purpose of the schools he said that the practical results which have already become apparent, in spite of the comparatively short time in which the system has been in operation, are remarkable:

"The one most noticeable from the installation of the new apprentice system has been the increased efficiency of the apprentices. This is largely due to the addition of the shop instructor, although the benefit of the class-room work is also apparent. Under the old system the foreman was expected to see that the boys received proper instructions concerning their work, and that they performed it properly. Ordinarily the foreman is too busy to give the boy anything like the proper amount of attention. With the addition of the shop instructor, who has the duty of looking after the boys, the efficiency of the apprentice has very greatly increased, with a resulting improvement both in the amount of output and the quality of the work done. There is no question but that the work accomplished by the shop instructors has more than paid for their salaries. The shop foremen, relieved of the care of the boys, can give their time to the more important details of the work.

"Reports from the ten shops where apprentice schools have been established on the New York Central Lines show that in every case the boys are not only turning out a better grade of work than ever before, but that they are working on machines, or doing bench work, that formerly it was not thought possible to entrust to apprentice boys.

"Another important advantage is that the apprentice, after he has had a few months of class-room instruction, can read simple working drawings, and the third and fourth year apprentices become adept in reading the most difficult drawings. When one stops to consider the comparatively small number of so-called mechanics in the average railway shop who can read working drawings readily, and the necessity of being able to do this, its importance can be realized. Not only this, but the boys are able to make sketches, or drawings, of shop devices or of broken parts, which it is oftentimes advisable to have for record at the local shop or for transmission to the mechanical engineer's office. During the past year the apprentices of the New York Central Lines made 1,344 drawings, which have been placed in the files of the New York Central Lines drawing rooms for use and record.

"The criticism may be made that this work will unfit the boys for remaining in the shop. A certain percentage of the boys will, of course, wish to be transferred to the drawing room, but anyone who is familiar with the difficulty of securing satisfactory draftsmen for a railroad drafting room, who have had the necessary shop experience to handle the work required of them to advantage, will realize that it is very desirable to have a few of the boys graduate from the shop to the drawing room.

"It is often desirable to conduct tests of tools or devices, or to determine the efficiency of various kinds of machines or other apparatus. The training which the boys have received in the class room has enabled a number of them to be used to great advantage during the past year in assisting on or conducting such tests. The benefit to the apprentice and the company is mutual.

"Another effect of the new system is the better discipline over the boys and the effect which this has had on the shop as a whole.

"At several of the shops the boys have organized apprentice or debating clubs. It is the practice to prepare papers on different topics and to discuss them. The class-room training helps the boys to take part in these meetings and has been the means of developing them to a considerable extent. This, in connection with the local baseball teams, which have been formed at three or four of the shops, has done much to establish a co-operative spirit among the apprentices and also to get them more interested in their work and in closer touch with the men.

"At several shops where it was formerly hard to obtain enough apprentices or to get a good grade of boys, little difficulty is now experienced, as the boys are assured of being given a thorough training in the trade and of having greater opportunities of advancement than formerly.

"It has been the practice for apprentices to occasionally make visits to neighboring shops of other roads or to some of the other shops on the system. This has had practical results, as indicated by the following extract taken from a report made at one of the apprentice instructors' conferences:

" 'Several of the boys obtained ideas which they put into use at once. One boy who was working on a boring mill changed the method of fastening the tires on the table to correspond to the methods he had seen at Schenectady. He did this without waiting for definite directions from the instructor, and soon found that he was able to gain one tire in his day's work. The impression made on the minds of the boys by observing the methods of experienced workmen prove much more lasting than when these same methods are explained ever so clearly by their instructors. It is a paying proposition to the company to allow either boys or men to visit other shops where work of a similar kind is being carried on.

" 'The boys, after the above-mentioned trips, were asked to write letters to the shop foreman as to their observations and what they had learned. These demonstrated the benefits which were gained.'

"The workmen are in thorough sympathy with the new movement. They realize that their sons are to have a better opportunity than they have had. The labor unions have given the movement their endorsement."

ELECTRIFICATION OF MELBOURNE SUBURBAN LINES.*

BY CHARLES H. MERZ, M.INST.C.E.

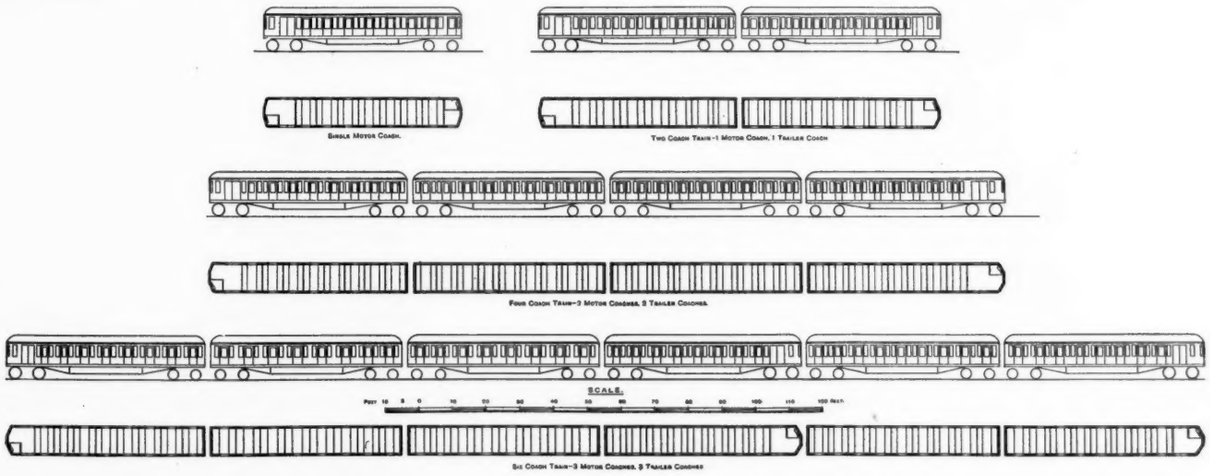
XI.

It has already been recommended that if electric traction be adopted, the suburban trains should be operated on the multiple-unit system.

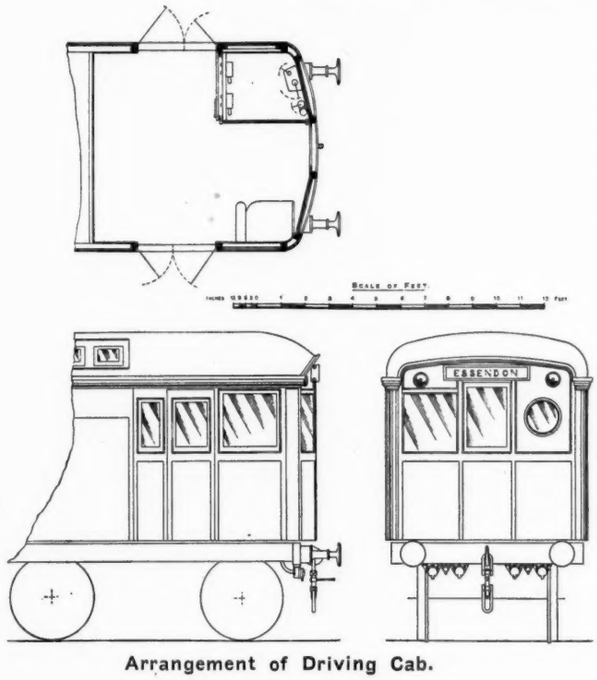
For your service, I recommend a standard train unit consisting of one motor coach and one trailer coach, with a seating capacity of 160 and equipped with two motors on one bogie of the motor coach. As there are many trains required for the service outlined which will never consist of less than two units (4 coaches) and in some cases three units (6 coaches) it is unnecessary to provide for driving cabs at both ends of all units, whilst a proportion of the motor coaches must be equipped with two driving cabs so that single motor coach trains may be used on the outlying lines to provide a frequent yet economical service. The general arrangement of multiple-unit trains for the different services is shown herewith.

Set workings for the proposed time table have been drawn up from which the number and type of coaches required can be definitely ascertained and also the number of coaches which it will be necessary to fit with one and with two driving equipments, respectively. The number and make-up of the trains required for each stage is given in the first of the accompanying tables.

For these trains, including an allowance of spare stock, the coaches in the second table would be required.



General Arrangement of Rolling Stock for Electric Operation.



Arrangement of Driving Cab.

Briefly, the equipment of each motor coach will consist of two motors mounted on one bogie, contact shoes or collectors on each side, a set of contactors or switches, a master controller, a motor-driven air-compressor for the brakes, and the necessary cables and connections for this apparatus and for lighting and heating. The drawing shows a typical arrangement of motorman's cab.

To connect up the electrical equipment the following circuits are required:

The control circuit, consisting of a number of small cables connecting the master controllers with the contactors and enabling the former to operate the latter.

The motor circuit, which carries the main current from the contact shoes through the contactors to the motors and thence back to the rails.

The train line, a continuous conductor connected to all the contact shoes, which is carried throughout the length of the train and enables a train to bridge the gaps in the conductor rail at special track work.

The auxiliary circuits for the air pump motor and for the lighting and heating circuits, controlled from a separate switchboard preferably erected in the driving cab.

The arrangement of the cables and wiring on electrically equipped trains is a matter requiring more attention than is sometimes given to it. On it depends very largely not only the

Make-Up of Trains for Proposed Electric Service.

Make-up of trains.		Pt. Melbourne and St. Kilda branches.	Stages I.	Stages II.	Stages III.
6-coach train (3 units)	Number of trains	2	12	21	24
	" " motor coaches	6	36	63	72
	" " trailer coaches	6	36	63	72
4-coach train (2 units)	" " trains	3	12	23	47
	" " motor coaches	6	24	46	94
	" " trailer coaches	6	24	46	94
2-coach train (1 unit)	" " trains	6	15	33	59
	" " motor coaches	6	15	33	59
	" " trailer coaches	6	15	33	59
Single motor-coach train.	Number of trains	..	1	3	3

*Abstract of the Report to the Victorian Railways Commissioners on the application of Electric Traction to the Melbourne Suburban Railway System. Published by the courtesy of the commissioners.

freedom from accidents, but also the cost of maintenance and the life of the apparatus.

There are two systems of wiring, each of which has advantages. In one of these the insulation of the cables is supplemented by running them in insulated troughing made fireproof by lining the interior surface with uralite or asbestos; this system is particularly adopted to a type of construction where wood-work forms part of the coach sub-structure. The other method is to depend entirely on the insulation of the cables and to run them in weldless steel conduit, preferably carrying the conduit right up to the apparatus. In your case I recommend that the latter method should be adopted as far as possible.

Number and Type of Stock Required at Each Stage of Conversion (Including Spares).

Type of stock.	Port Melbourne and St. Kilda Branches.	Stage I.	Stage II.	Stage III.
Motor coaches (2 driving cabs)	2	4	6	9
Motor coaches (1 driving cab)	20	85	160	241
Trailer coaches (1 driving cab)	8	20	40	78
Trailer coaches (no driving cab)	12	60	109	168
Total	42	169	315	496

The handle of the master controller will be so arranged that if the motorman's hand is removed while the power is on, the current is automatically cut off and the brakes applied.

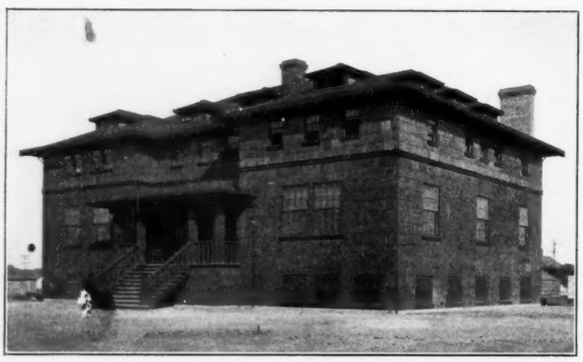
(To be continued.)

SALOONS VERSUS RAILWAY CLUBS ON THE HARRIMAN LINES.

BY F. G. ATHEARN.

Superintendent of Railway Clubs of the Southern Pacific Company.

The saloon-keeper, much as we may condemn his purpose and regret his influence, has been a close student of social tendencies and needs. He has made a special effort to incorporate into his business the things that make a man feel, even if only momentarily, that he has put the hardships of life behind and reached the goal of surcease from strife. He tries to make his customer care-free, at rest and welcome. When polish and glitter, easy chairs and inviting games, warm fires and hospitality fail, he has whisky to drug the senses and aid the unfortunate victim in making himself believe that he is what he is not.



The Roseville Club House.

Aside from his baneful influences, the saloon is, and has been, almost an ideal workingman's club. It has satisfied, to a certain degree, a primal, social craving. It is a place where a man may go whenever he is so inclined; where he can meet those with whom he has a common interest; where he is certain he will be welcome, and where he will find rest and recreation. Things are arranged and especially adapted to his needs. The pleasures offered are within his means. There are no extremes of social grades to make him uncomfortable. It makes not the slightest difference what his relations with a given person may be outside of the saloon; here all social and official inequalities are obliterated. The workingman, in these surroundings, feels himself a man and on an even footing with every other man. Here, too, his physical well-being is provided for. There are clean toilets, armchairs, cheerful fires and warm, well-cooked lunches. There is no direct demand for payment for these privileges; there is no membership fee. These things are paid for indirectly through the stuff he buys. All are desirable and conducive to happiness.

Card Room and Office at Roseville.

It should be further noted that the saloon is nearly always most conspicuously and conveniently located. Whenever possible, it will be found with a brilliant and attractive entrance, astride the cross-roads. How different is this from the usual method of the reformer, who hires a chilly, lonesome room on the second or third floor of a side street building and puts out a little sign, "Free Reading Room Upstairs. Everybody Welcome," and there sits with chattering teeth and wonders why the place is not crowded. Men want to be where things are "doing." The saloon has a tang of reality about it that no other institution has.

For a tired man's nervous system to respond and his body to be recreated he must have pleasures that are clear-cut and in contrast to the daily routine of his life. What nature demands we crave. The saloon has been developed to meet this demand. It is true that the saloon-keeper has aborted this to

Library and Writing Room; Southern Pacific Club House at Roseville, Cal.

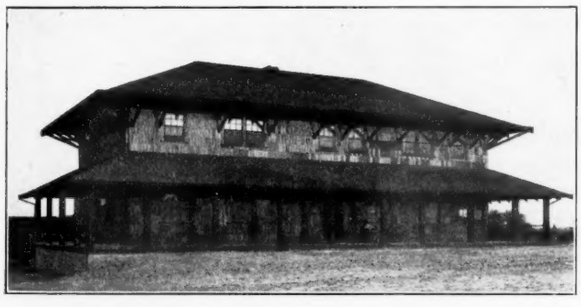
his own selfish and unlawful ends. It does not follow, however, that because the devil has taken possession of an institution that came into being as the result of perfectly natural, human desires, we should totally disregard the facts and tendencies made evident by it.

Silhouetted against the screen of the past may be clearly

Interior of Club at Dunsmuir, Cal.

seen the tendencies that have fostered the saloon. Since the earliest days, when with crudely fashioned, flint-tipped reed, our ancestors slew their food and "cheek by jowl, with many a growl talked the marvel o'er," men have been gregarious. They have needed and demanded company. They have nourished the desire to attain a position where the never-ending struggle for existence might be lessened. Josiah Flynt gives it as his conclusion that by far the majority of the men who fail and become social degenerates are lured astray by the hope of quickly acquiring ease and comfort. Man longs for the better and brighter side of life, and, like the moth drawn to the flame, he finds, only too late, that the short cut has been a delusion, and that the net results are a pair of singed wings, impaired health and effectiveness.

To raise the standard of employees mentally, physically and morally, and thereby obtain a higher degree of efficiency and at the same time give opportunity for the exercise of those normal and natural tendencies which heretofore have attracted men to the saloon, is the vital problem which the management of the properties usually known as the Harriman Lines has attacked by methods which are at once stripped of all maudlin sentimentality and subterfuge, and brought down to scientific business principles. There is nothing asked for which is not paid for; there is nothing given for which return is not expected in some form. It is simply a question of whether the money expended is productive of higher efficiency; for all problems, whether social or economic, finally resolve themselves into problems of efficiency. This is particularly true with a railway, whether it be a matter of determining



Southern Pacific Club House at Yuma, Ariz.

the most advantageous method of train operation, or the more important question of whether or not the maximum of efficiency is being obtained from the individuals who handle the trains. It has always been considered poor economy to do anything that would lessen, or to neglect to do anything which would increase, efficiency. But it has been in comparatively recent years that this same consideration has been made to apply to the men who do the bulk of the physical labor in running our railways.

The problem, which in this case is a social one, has not been given the close and intelligent study that has been accorded to the purely physical problems involved in railroading. Yet 42 per cent. of the gross receipts of a railway goes to pay salaries. And while we have gone to great pains to ascertain and obtain the most favorable conditions for a locomotive to work under, we have allowed the human engine to run without attention, or have left its care to spasmodic bursts of misdirected philanthropy, or have been content to believe that human efficiency depends primarily on morality, and hence have concluded that the burden of its care may be intrusted to institutions or individuals whose concern is for the soul rather than for the body. The question of a man's willingness to work may be an ethical one, but certain it is that his ability to work is a physical one. Without, however, discussing at this time the validity of the reasoning involved in this latter proposition (for I am aware that there are those who would honestly take issue with me as to the best agency to accomplish the ends desired), it must be borne in mind that,

Club House at Tucson, Ariz.

regardless of the methods employed, physical fitness, and ability to do, and ultimately morality, too, always will depend upon physiology. High ideals and empty stomachs do not make strong backs and sinewy arms. It takes good food, well cooked and plenty of it, sufficient rest in clean and comfortable beds, refreshing and cleansing baths, recreation for both mind and body, and an opportunity for social intercourse to give rest to it all.

Since so great a proposition of the expenditures of a railway goes to the employee, and inasmuch as the measure in which the employee returns "value received" depends upon physiology, it follows that the socio-physiological problems—viewed from the standpoint of relative financial importance—should be more carefully studied than any of the many physical questions in connection with railroading. Their solution should not be left to chance philanthropy or single-eyed zeal. They should be investigated with the purpose of discovering all the factors involved, and to the end that the solution shall become an integral and continuous part in the economic scheme which forms the basis and gives right of place to the business of railroading.

The weak link in the chain is the one which joins the employer to the employee. There has been a lack of sympathy. Often when the employer has asked the employee to improve his habits and exercise more care and accuracy in the discharge of his duties, the request has been resented as unreasonable and unfair. The employer made the request because he believed that compliance therewith was his just due, because

he believed it to be for the best interest of the employee himself, and because the safety of the traveling public demanded it. The request was interpreted as greed; the resentment as moral turpitude. In most cases of this kind the physical and social environments were such that compliance with the demand was practically impossible. Both parties failed to recognize this—the education of both was defective.

The position is taken that the company having once paid an employee a fair day's wage for a fair day's work, performed under conditions cognizant to both parties at the time the work was undertaken, its economic obligation to that employee is fully and completely discharged. Now, if conditions are brought about voluntarily by the company, at its own expense, which make it possible for the employee to render services of more value, and which at the same time make the lot of the employee easier, the company should support the institution through which this increase is made possible, in so far as the services, under these circumstances, are of greater value than they would have been normally, and in so far as this same institution renders a contribution to the employee individually which is over and above his stipulated compensation, by adding to his material welfare, conducing to his peace of mind, and making him happier on the whole, he should aid in its maintenance.

It is along these lines that the railway clubs for employees have been built up. And the writer is free to confess that in doing this a study of the saloon and its methods has been, in large measure, a most valuable aid. Eliminate gambling and drinking, and there is none of the features of a saloon but should be sought for a railway employee's club—in fact, for any club. The men are accepted as they are, and provision is made for their physical comfort and enjoyment, which makes for greater efficiency and longer duration of service.

The club buildings are first of all attractive and constructed especially for the purpose. They depart from the severe railway type and are made club-like. They are furnished with the best and made pleasing both inside and out. The cost ranges from $10,000 to $35,000. Each club has hot and cold baths, a library of fiction and reference books, correspondence tables on which may be found neat club stationery, a billiard and pool hall, a gaming and recreation room, barber shop, cigar counter, a restaurant, which is open twenty-four hours a day, and a large number of bedrooms.

The restaurant and beds are deserving of special mention. In the restaurant, particular emphasis is placed on the proper cooking of food and on making it appetizing. The service is very simple, but neat. What is saved in service is put into food. There are four complete meal combinations, known as club meals, prepared each day. There is also quite a list of short orders. The charges are moderate; a good substantial meal may be obtained for from 15 to 25 cents. The cooking is done in plain view and everything is kept scrupulously clean. The bedrooms are small sleeping stalls, entirely open overhead in order to provide abundant ventilation. There are single iron beds with wire springs, each equipped with a 20-lb. silver-gray hair mattress, a feather pillow and woolen blankets. The linen is changed throughout for every man, and a charge of 15 cents is made for a night's rest. Preference is always given to train crews not at their home terminal.

The cost for a shave in the barber shop is slightly less than the usual charges for such service. The difference is chiefly due to the elimination of charges for extras.

A charge of 10 cents is made for a bath, two towels and soap being furnished.

The billiards and pool are paid for at the rate of 5 cents an hour a cue. The tables and cues are of the best, and much superior to any found in the average railway town, and hence are a great attraction.

Card tables and cards are provided. Gambling, of course, is strictly prohibited.

Cigars, tobacco and soft drinks are sold at standard prices.

In order to help men who are out of money, a system which practically amounts to advancing on salaries is in effect. An employee is allowed to sign an order against his wages for either $1.50 or $5. The amount is given to him in the form of coupons that are exchangeable for commodities and accommodations offered by the club the same as money.

The club rooms are so arranged that they may be used for entertainments, dances, lectures, etc., and they are put to such use frequently.

Each club is in charge of a secretary, with a sufficient corps of assistants to keep things clean, for *cleanliness* is the watchword. The secretary is chosen for his interest in welfare work and his ability to get on with men. He represents the lubricant that keeps the machinery of a concern of this sort running smoothly, and too much care cannot be exercised in his selection.

For all these privileges there are no other charges than those stated. There is no membership fee, no monthly deduction from pay check. There are no rules posted to govern conduct. There is not a notice to be found telling the men what they may or may not do. Espionage is not permitted. The men may discuss whatever they please without fear of its being reported to their superiors. There is no free list; superintendent and section hand enter the club on exactly the same footing. Any railway man who wishes to participate in the benefits of the club must subscribe to the following:

"I hereby certify that I am a bona fide employee of the ———— Railroad Company and I agree to conduct myself as a gentleman while enjoying any of the privileges of the club."

The whole aim of the clubs is to take care of the employee, whether he be in search of food, of rest, of play, or of study. And the best testimonal of the appreciation of these institutions is the fact that the clubhouses are crowded night and day, and that there has yet to be committed the first act of vandalism.

The Southern Pacific Company already has four of these clubs in full operation and is now preparing to construct seven more. The Oregon Short Line also is building three, and it is expected to extend them on to other lines as rapidly as time will permit.

THE NEW CAR SHOPS OF THE UNION PACIFIC AT OMAHA.

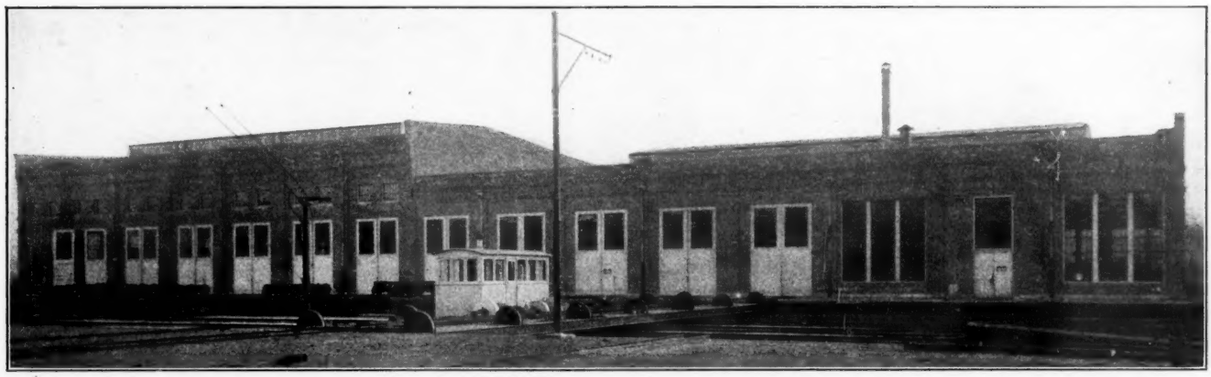
The Union Pacific Railroad has recently completed and is now operating its new car department plant at Omaha, comprising coach, cabinet, freight car, truck, wheel and axle and paint shops and a freight car repair yard. This plant, when finally completed, will also include a planing mill, dry kiln and lumber sheds, and will be one of the most modern car plants in the West.

The buildings are of brick and steel construction. They are amply lighted and well ventilated and heated by means of a Sturdevant blower system. The shops are supplied with large lavatories and equipped with modern individual wash basins and lockers. The comfort of employees was given careful thought.

The car department is provided with a sub-store department, to facilitate the delivery of material, and the different shops, yards and material platforms have been so located that the cost of handling material has been reduced to a minimum. Conveniently located near the paint shop is an independent fire-proof building for the storage of paints and oils. The coach shop is connected with the paint shop by a 90-ft. electric transfer table. This transfer table, which is one of the largest in this country, was supplied by Geo. P. Nichols & Bro., Chicago.

For the removal of trucks from coaches, or for re-trucking, the car department has been provided with a 60-ton Whiting gantry crane, located outside the shop building over a track

leading to the transfer table. After removing the trucks, which are sent to the wheel and truck shop, the car is mounted on temporary trucks and passes through for repairs. Coaches coming in for repairs are stripped and the various parts and furnishings are distributed to the cabinet shop, plating room, upholstering room, varnish room, or to any of the other departments for repairs or renewals. The coach, after repairs are completed, is delivered to the paint shop and passes from here ready for service.



Coachpaint, and Wheel and Truck Shops.

The freight car shop is equipped with overhead traveling cranes for handling cars and heavy material, and will also be equipped with modern machinery for repairing and building steel cars. The tracks, both in the repair and yard shop, are connected at each end with ladders, thus facilitating the movement of cars. Repair tracks are 22 ft. centers, and the yard has been well supplied with a system of narrow gage material tracks, so arranged and connected that material can be delivered to any point with the least expenditure of time and labor. A ten-ton electric crane spanning three tracks is used for unloading wreckage and handling heavy material.

Coach Paint Shop.

The company list gives in detail the machinery intended for the planing mill, that already installed at the various shops, and the method of driving. In most cases the machines are individual motor driven, a few of the smaller machines being grouped. The electric motors are Westinghouse, using alternating current.

Taking up the different departments more in detail, it will be seen that there are only two main buildings, one on each side of the large transfer table. The main car shop contains a cabinet shop with its accessories, the coach repair shop with a large storeroom, and the freight repair shop, forming a long ell on this large building. The other building contains the coach paint shop and the truck and wheel shop.

Commencing at the extreme west end of the main car shop, the first section is occupied by the cabinet shop, which is 178 ft. long and 80 ft. wide, arranged with work benches along the west wall, and 33 ft. from the wall is a 2-ft. gage material track extending through the shop. Between this track and the inner wall the woodworking tools are arranged and the majority of them are motor driven. The names of the tools are marked on the plan, and the names of the makers and the size of the motors required for them are given in the tool list. At the northeast corner of the cabinet shop there is a scrubbing room with cement floor, 24 ft. square, and along the inner wall at the south end is a large glue press and heater box.

A low partition separates the cabinet shop from the upholstering shop and plating room. The upholstering shop is 56 ft. x 80 ft., and next to it is a tin shop 19 ft. x 37 ft., and a pipe shop, 19 ft. x 40 ft., equipped with all necessary tools. On the opposite side of the passageway is the plating room, 39 ft. x 82 ft., and separated by a brick partition is a large lavatory containing 78 double spigot basins and 130 metal lockers. The coach repair shop, 178 ft. x 40 ft., contains

seven through tracks, each long enough for two large cars. Two of the tracks have pits 18 in. deep with cement floors. These are for convenience in working on the under side of the car and in repairing pipes and air brake fixtures. Next to the coach shop is a large storeroom, 38 ft. x 178 ft., and in it is located the office of the general foreman and a room for blueprint drawings. A 2-ft. supply track extends through the length of this storeroom.

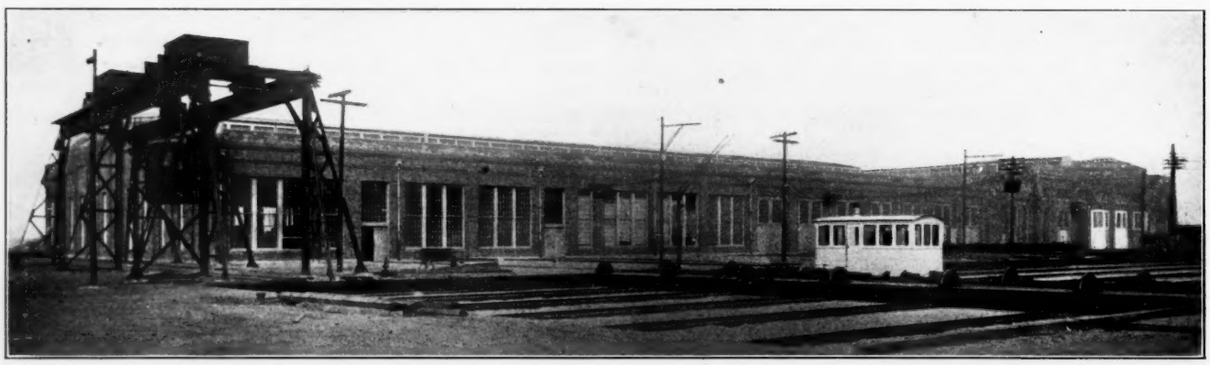
The freight car shop is 150 ft. wide and 340 ft. long, with a lean-to 30 ft. deep for the hot blast heating fans. One bay of the freight shop is fitted with a 20-ton Whiting electric traveling crane, 50-ft. span, and the middle bay, 40 ft. wide, is constructed with longitudinal girders for a future overhead crane. The floor of this shop is made of gravel from Sherman Hill.

On the opposite side of the transfer table is located the coach paint shop and the wheel and truck shop in one building. The cross section of the portions of the building for these two departments is different, as is shown in the cross sections here illustrated, that of the paint shop, being symmetrical with the Louvre ventilator at the center and with side walls 27 ft. 2 in. high, while the truck shop has at one side a high bay 60 ft. 2 in. wide, with outer wall 37 ft. 5½ in. wide. This bay is constructed with longitudinal girders for a 10-ton electric traveling crane for lifting trucks, wheels, axles and other heavy material.

The interior arrangement of the paint shop is shown on the floor plan with varnish room 175 ft. 2 in. x 39 ft. 6 in. at one end, and next to it the lavatories, glass cutting room and acid room. The paint shop proper has five through tracks long enough for two cars on each track. The floor is made of brick between tracks and along a small border outside of the rails, while the remainder is made of concrete with cement top finish, the latter being used for floors throughout the remainder of the building. The paint store is in a small separate building, 62 ft. x 32 ft. outside brick walls, 18 ft. high from floor to lower side of roof truss. It has a small circular counter at the entrance and the arrangement of tables, shelves and racks is shown plainly in the floor plan. The barrels of liquid materials are hoisted by an air cylinder on the outside to a platform and then rolled on an inside platform over the large tanks and are emptied into them by gravity.

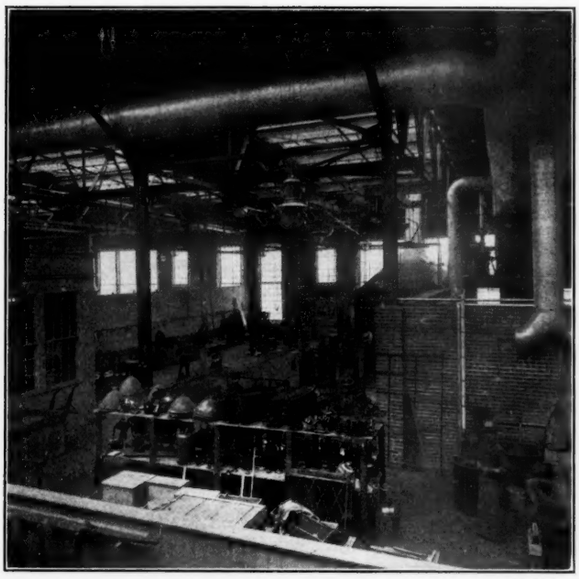
The planing mill, 90 ft. x 260 ft., is shown in dotted lines on the general plan, as it has not yet been erected. The pro-

Cabinet Shop.

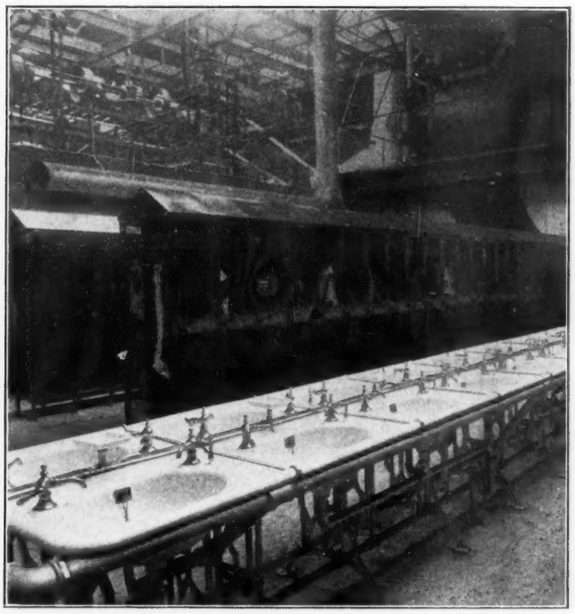


Car Shops, Showing 60-Ton Gantry Crane and Transfer Table.

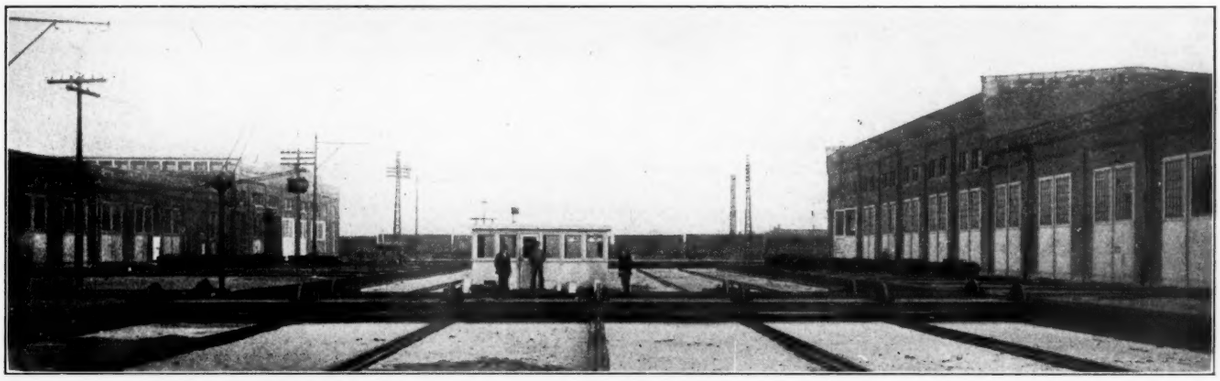
Freight Car Repair Shop.



Plating Room.



Lavatory; Coach Shop.



90-Ft. Transfer Table Connecting Car Shops With Paint and Wheel Shops.

Coach Shop.

posed arrangement of the woodworking machines for this shop is shown in detail floor plan, and the names of the tools and the size of the motors required for them are given in the tool list.

The general arrangement of the new car shops with respect to the older locomotive shops is shown on the general plan. The steam for heating the former and the electric current for lighting and power are obtained from the power house at the locomotive shops.

The plans for the shop buildings were prepared under the direction of the chief engineer, R. L. Huntley; and those for the location of machinery and other mechanic details, by A. H. Fetters, mechanical engineer, under the direction of W. R. McKeen, Jr., then superintendent of motive power.

Cabinet Shop Machinery.

Automatic cut-off saw	Fay & Egan	7½	h.p. motor
Rip saw	Fay & Co.	7½	" "
Jointer	S. A. Woods	5	" "
26-in. single surfacer	Fay & Co.	10	" "
36-in. band saw	Fay & Co	5	" "
Double cabinet maker's saw	Greenlee	7½	" "
7-in. moulder	Rowley & Hermann	10	" "
Universal wood-worker	Bentle & Margedant	5	" "
No. 2 scroll saw	Fay & Egan	2	" "
48-in. sander	Berlin Mach. Wks.	30	" "
Carver and dove-tailer	Boults		
No. 3½ vertical mortiser	Fay & Egan		Group
Tenoning machine	Fay & Co.	20	h.p. motor
Grindstone			
Double emery wheel	Norton		

Plating Room

21-in. upright drill	Cincinnati		
Sensitive drill	Barnes		
3 buffing lathes	Buiders		Group
14-in. x 5-ft. lathe	Champlin & Spenser	10	h.p. motor
16-in. x 8-ft. lathe	Lodge & Shipley		
Double emery grinder	Norton		

Grindstone, motor and generator set 150 amperes.

Upholstering Shop.

1 hair picker	Champion	Air motor
2 sewing machines	Singer	1/10-h. p. motor on each.

Pipe Shop.

3-in. pipe machine	Sanders	5	h.p. motor

Mill Machinery.

36-in. heavy autom. cut-off saw	Proposed	15	" "
40-in. heavy autom. cut-off saw	"	15	" "
5-spindle car boring machine	"	20	" "
32-in. self-feed rip saw	"	20	" "
24-in. self-feed rip saw	"	15	" "
16-in. heavy autom. car gainer	"	15	" "
13-in. automatic end tenoner	"	15	" "
2½-in. heavy hor. auto. hollow chisel mortiser	"	15	" "
18-in. double cabinet maker's saw bench	"	7½	" "
30-in. single surface planer	"	7½	" "
2 spindle moulder and shaper	"	5	" "
4-in. band resaw	"	15	" "
14-in. variety saw	"	7½	" "
15-in. x 6-in. 4-head planer and matcher	"	40	" "
24-in. dimension planer	"	30	" "
20-in. hand jointer	"	5	" "
10-in. 4-sided moulder	"	10	" "
28-in. swing cut-off saw	"	7½	" "
66-in. triple drum sander	"	30	" "
2½-in. heavy vertical hollow chisel mortiser	"	15 & 5	" "
44-in. band saw	Atlantic	7½	" "
Horizontal tenoner	Greenlee	15	" "
No. 55 surfacer	S. A. Woods	20	" "
Swing cut-off saw	S. A. Woods	7½	" "
13-in. moulder	S. A. Woods	25	" "
4-spindle horizontal borer	Greenlee	15	" "
7-in. moulder	Fay & Egan	15	" "
42-in. band saw	Atlantic	5	" "
No. 4 car sill planer	Berlin	60	" "
Universal wood-worker	Bentel & Margedant	7½	" "
Automatic dove tailer	Fay & Co.		
No. 70 tenoning machine	Fay & Co.		Group
No. 3½ vertical mortiser	Proposed	10	h.p. motor
No. 2 2-spindle radial borer	Greenlee		
Carver and moulder	Proposed		Group
Scroll saw	"		7½ h.p. motor
24-in. x 16-ft. patternmkr's lathe	"		Group
26-in. x 5-ft. lathe	Fay & Co.		7½ h.p. motor
Hollow chisel grinder	Atlantic		
Band saw setting machine	Proposed		
Band saw filer			Group
Band and circle and rip saw sharpener	"	10	h.p. motor
Plane knife grinder	"		
Auto. circle and rip saw grinder	"		
2 double emery grinders	Norton		

The German Usambara Railway, which extends from the Indian Ocean westward, just a little south of British East Africa, and has for four years been in operation for 80 miles inland, is not a very productive enterprise yet. For the three years from 1905 to 1907, inclusive, its earnings per mile were, gross, $557, $738 and $1,212; and net, $160, $333, and $633, respectively. But there is encouragement in the way it grows. The road has cost $2,150,000.

TWO-CENT FARE LEGISLATION.

Slason Thompson furnishes the following statistics relative to the 2-cent fare legislation of the last few years:

States Placing a Limit on Passenger Fares.

	Passenger fare limited to	Miles of line per hundred square miles of territory.	Population per mile of railway in 1906.
Alabama	2½ cents	9.64	416
Arkansas	2 "	8.54	314
Illinois	2 "	21.64	448
Indiana	2 "	20.05	377
Iowa	2 to 3 "	17.88	222
Kansas	3 "	10.88	181
Michigan	2 to 3 "	15.50	290
Minnesota	2 "	10.38	248
Missouri	2 "	11.74	417
Montana	3 "	2.26	92
Nebraska	2 "	7.59	183
North Carolina	2¼ "	9.08	476
North Dakota	2½ "	5.36	123
Ohio	2 "	22.79	486
Oklahoma	2 "	7.18	212
Pennsylvania	2 "	25.04	621
South Carolina	3 "	10.78	453
South Dakota	2½ "	4.19	145
Virginia	2 to 3½ "	10.19	473
Washington	3 "	5.38	174
West Virginia	2 "	13.08	340
Wisconsin	*2 "	13.61	312

* All but small roads.

In contrast with the conditions under which railways operate in these states may be cited those in the following states and countries where density of population warrants low passenger fares:

	Miles of line per 100 square miles of territory.	Population per mile of railway.
Massachusetts	26.36	1,439
Connecticut	21.01	989
England and Wales	27.20	2,050
German Empire	16.56	1,754
France	13.95	1,359
Belgium	25.17	2,353

A second statement gives the passenger earnings of 27 railways, each of which does business in one or more of the states named above, together with the average receipts per passenger-mile for each road, in 1906-07 and 1907-08, and the passenger revenues for each road in the latter year, if the average rate of the preceding year had prevailed:

Summary of Passenger Earnings of 27 Railways for Year Ending June 30, 1908; Average Receipts per Passenger Mile in 1908 and 1907 and Loss Caused by Legislation.

Name of road.	Avg. receipts per passenger mile. 1908, cts.	1907, cts.	Actual passenger revenue 1908. (000 omitted.)	Passenger revenue calculated on average receipts of 1907. (000 omitted.)	Loss produced by two cent legislation.
Atchison, Topeka & S. F.	2.10	2.18	$21,643	$22,458	$814,818
Baltimore & Ohio	1.87	1.95	13,736	14.213	476,951
Central of Georgia	2.30	2.41	2,953	3,096	143,398
Chesapeake & Ohio	1.78	2.15	5,120	6,184	1,064,215
Chicago & Alton	1.85	2.05	3,511	3,890	379,482
Chicago & East. Illinois	1.76	2.04	1,680	1,960	280,365
Chicago & North-W'n	1.81	1.99	15,734	17,302	1,567,547
Chicago, Bur. & Quincy	1.85	2.07	18,819	21,040	2,221,359
Chicago, Mil. & St. P.	1.91	2.20	11,883	13,630	1,747,290
Chicago, R. I. & P.	1.89	2.23	16,693	19,668	2,975,289
Chicago, St. P., M. & O.	1.97	2.26	3,600	4,215	524,723
Evansv'le & Terre Haute	1.93	2.29	570	677	107,276
Great Northern	2.27	2.39	11,189	11.797	608,152
Hocking Valley	1.63	1.78	837	914	77,131
Illinois Central	1.85	1.96	10,991	11,618	626,413
Iowa Central	1.88	2.24	479	569	89,891
Kansas City Southern	2.31	2.37	1,302	1,351	48,611
Minneapolis & St. Louis	1.82	1.92	1,003	1,060	57,224
Minn., St. P. & S. S. M.	2.09	2.28	2,681	2,925	243,858
Missouri Pacific	1.95	2.24	8,814	10,142	1,328,061
Norfolk & Western	1.90	2.36	3,977	4,941	963,595
St. Louis & San Fran.	2.15	2.56	8,927	10,602	1,675,919
St. Louis Southw'n	2.19	2.42	1,924	2,094	169,753
Southern Railway	2.30	2.45	14,315	15.252	936,636
Toledo, St. L. & West	1.59	1.79	519	583	63,437
Wabash Railroad	1.77	1.86	6,470	6,800	329,448
Wisconsin Central	1.80	2.00	1,608	1,706	98,655
Total			$191,079	$210,699	$19,619,345

Same roads in 1907	$193,026,000	
Decrease	1,947,000	
Average rate per passenger mile	1.964	cents in 1908
Average rate per passenger mile	2.166	cents in 1907
Decrease	0.202	

WORK OF THE AMERICAN RAILWAY ASSOCIATION.*

BY W. F. ALLEN,
Secretary of the Association.

II.

I have mentioned the fact that there are over 2,200,000 freight cars in use upon our American railways and that the interchange service of this equipment is very great. Many questions concerning this service outside of those connected with the maintenance and the cost of repairs of the cars are constantly arising.

So in 1889 a "Committee on Car Service" was appointed to suggest rules to govern this interchange use and to prevent the undue detention of the cars of one company upon the lines of another. When a car is loaded by one road and sent over the lines of another, it is intended that it should be returned, either loaded or empty, by the same route that it took on the outward journey. But, if at any station this car is found empty, and there is a load waiting to be shipped, the persuasions of the shipper and the inclinations of the agent are likely to result in the car being sent under load in whatever direction the freight may be going. In the meantime the road that owns the car is deprived of its use and from that cause may be unable to supply the demands of shippers on its own line. This condition of affairs has been the subject of long and heated controversies. It is claimed that the only permanent solution is the pooling of the cars, so that all cars can be used in common as vehicles of transportation without regard to whom they belong. This has been strongly advocated by those who have closely studied the subject, although undoubtedly great difficulties would be encountered in its practical operation. Those opposed to this plan object to the control of the cars being taken away from their owners, and viewing the matter in that light consider the proposed remedy worse than the disease. To this the advocates of pooling reply that the owners of cars have practically no control over them to-day.

For many years when one company used the cars of another company, it paid for their use at so much per mile run, latterly six-tenths of a cent, and kept the account itself. On July 1, 1902, this arrangement was changed after a long contest and an agreement entered into under which so much per day is paid. This method called the "Per Diem" system is now employed, but the rates have varied at times from 20 cents per day to 50 cents per day. During the very active business season of 1907 when cars were in demand, greatly in excess of the supply, the rate was 50 cents; and 75 cents or even $1.00 per day would in many cases have been gladly paid by the companies which were short of them, if the cars could have been obtained. When the dull business season of 1908 set in, the rate was reduced to 25 cents per day at which it still remains. The law of supply and demand governed these rates, rather roughly, it is true. They were adopted after having been approved by the companies which own more than two-thirds of the total number of cars.

The change in the method of payment for cars made it necessary to provide a code of rules to govern the service and these rules called the "Code of Per Diem Rules" were adopted in 1902. They provide among other things for an arbitration committee to settle all disputes that may arise between the owners and users of freight cars under the per diem rules and for the interpretation of the rules.

Co-operating with the Committee on Car Service and under the same Chairman is a Committee on Car Efficiency, organized in 1906.

The average movement of a freight car is less than 25 miles a day of which from 30 to 40 per cent. is without load, even in busy times. It is not the actual slow movement of the car which causes this low average, but its detention at terminals. This is largely caused by abuses which have grown up under severe competition, such as permitting consignees to use the cars as storehouses for their goods and undue delay in loading aand unloading. In no other country in the world are shippers and consignees given anything like such privileges in the use of cars as in this country. I can state this with confidence as I now have in my possession official information on the subject sent me in connection with a report to be made to the next International Railway Congress.

A permanent bureau of statistics has been established by the Committee on Car Efficiency, having offices in Chicago and New York, and very interesting and valuable reports are published from time to time showing the condition of the car supply, the general performance of the freight equipment and other important items. These reports showed that while in February, 1907, there was a demand for 150,000 more cars than could be supplied and in October, 1907, for 90,000 more cars, yet on December 24, 1907, there was a surplus of 209,000, which surplus reached 413,000 in April, 1908. These cars were lying idle upon the side tracks and with the accompanying idle engines would have completely filled a single track line from New York to San Francisco.

It will be realized that regulations to govern and hasten the movement of cars when there was a shortage of 150,000 would not be advantageous when over 400,000 were idle. Practices entirely equitable under the one condition worked unnecessary hardships under the other condition and resulted in no small economical loss.

A very important Commission has been appointed by the American Railway Association to determine what the user of a car should pay to the owner for its use and to decide upon a method by which the owner may be able to obtain control of his own cars when he has need of them. Skillful experts have been engaged at work for several months in the preparation of data to enable the Commission to settle these questions upon some mathematically correct and equitable basis. When it arrives at its conclusions, they will be submitted to a letter ballot. Its report has not yet been issued.

A Committee on Safety Appliances was organized in October, 1889. One of the most important functions of the operating department is the promotion of safety. The public as a rule only hears of those accidents where injury to persons or loss of life occurs. In addition to these, there are a great number of minor accidents which result from all sorts of causes, most of them out of control, unless perfect materials and infallible employees can be secured. A so-called safety device intended to remedy one of these causes may aggravate others, and do more harm than good. Thousands of devices offered to operating railway officials are of this character.

The Committee on Safety Appliances, however, does not examine special devices. It does consider and decide upon what are the essential requisites of any installations intended to promote safety. If a device in its operation violates any of these essential requisites, or fails to fulfill them, it ought not to be used, but inventive genius may be freely employed within the prescribed lines. The essential requisites for train heating, train lighting, automatic couplers and power brakes have been formulated by this committee. It has also formulated a Code of Air Brake and Train Air Signal Rules.

Another subject that it has acted upon is that of uniform rules for the examination of applicants for employment or for promotion. An applicant must submit to a physical and mental examination for the purpose of ascertaining whether he is capable of fulfilling the duties of the position he seeks. Among other requisites that of good eyesight, free from color blindness, is essential. Certain simple but effective tests are prescribed. The more eminent among the chief railway surgeons were consulted in the formulation of these rules. Provision is made for expert examination of the test-sets supplied for the examinations as to color blindness.

It must not be understood that it is possible always to submit

*From an address on "Railway Operating Associations," delivered before the Harvard School of Business Administration, January 11, 1909.

applicants for employment in the operating department to the rigid examination which these rules prescribe. In times of such stress as occurred in the early part of 1907, when the transportation facilities of the country were taxed beyond their limit, by shippers seeking an early market for their goods, great pressure was put upon the railway companies to increase their service and it was not possible to undertake more than the most essential of these examinations. Many men were necessarily admitted to the service who might have been rejected in normal times. In the quieter times that have since intervened, a weeding out process has been possible and a higher standard of service in consequence undoubtedly exists to-day.

Probably the examinations in busy times were similar to the one that the Hon. Theo. B. Reed is said to have undergone when he applied for admission to the bar of California. He and another young man came before the examiner who happened to be in a considerable hurry. He asked them both a single question on a then much mooted subject, "Is the Legal Tender Act constitutional?" Reed answered promptly "yes," and the other man, with equal promptness, said "no." Gentlemen," said the examiner, "any man who can answer that question off hand ought to be a member of the bar. I admit you both."

In the installation and operation of block systems and interlocking plants there are involved questions which relate to subjects within the province of this Committee on Safety Appliances, and others which affect the rules for the operation of trains, which latter subject belongs to the Committee on Train Rules. These two committees therefore act together on these subjects under the title of "The Joint Committee on Interlocking and Block Signals." It has formulated a code of rules for the installation and operation of interlocking plants and block signal systems.

A Committee on Statistics and Accounts was established in 1899. Railway operating statistics are extremely troublesome to formulate because of the difficulty of arriving at a satisfactory or stable unit, or a formula which does not omit some important factor. Some formulas have been advocated which appeared to be mathematically correct, but which, when carried out, demonstrated that it was cheaper to operate a road with heavy grades than with light ones, which, of course, is a practical absurdity.

There are very many factors to be considered in the statistics of railway operations and the relative value of these factors is constantly changing. A formula which was at least approximately accurate a few years ago may be found radically defective to-day. It may be said of railway statistics as of railway accounts that no matter how accurately they may be compiled they can never be entirely independent of the physical facts that are behind them.

Accounts and statistics show things in black and white. So do photographs. You may photograph fine scenery, a bouquet, or a beautiful woman with the utmost skill of the art; but the colors of the landscape, the perfume of the flowers and the grace and charm of beauty cannot be thus completely depicted. A prudent man would hardly decide to purchase a house, or marry a woman when their photographs only had been presented to him. So also with a railway. After statistics and accounts of its operation, stated with the utmost accuracy, have been fully examined there yet remain physical facts which must be taken into consideration if you are to arrive at correct conclusions. And these differ greatly at different times on different roads, or even on different divisions of the same road.

This committee has therefore acted with great caution, preferring to recommend, from time to time, units and formulae for trial and report, rather than to run the risk of having expensive and unnecessary compilations of operating statistics forced upon roads, especially the smaller ones, where they might not serve any useful purpose in testing efficiency. The fundamental duty of the operating department is to move the great traffic of the country safely and expeditiously without unnecessary waste of energy.

Energy may be expended with exactly equal skill in two separate roads, and yet, because of unavoidable diversities in the prices of labor and material, or in the nature of the traffic, or of the road itself, the results may appear widely different when reported in a financial statement. It is also quite certain that when railway financial statements show favorable results that have been obtained by any other means than efficiency of operation, no matter how accurately the figures may have been compiled, they are quite sure to be more or less misleading.

The gages of railway track, that is the distances from rail to rail, have varied from three feet, to six feet in this country, and to seven feet in England. In 1897 the American Railway Association established a standard gage of 4 ft. 8½ in. The Master Car Builders' Association had established a wheel gage and a wheel section in 1894, and the American Society of Civil Engineers had adopted a certain section for rails in 1893. In 1905, the Master Car Builders' Association desired to strengthen the flange of the wheels on account of the greater weight they must carry by reason of the larger cars in use. The gage and the section of the wheels bear an intimate relation to the gage and section of the rail, but there was no association which was authorized to deal with both. So in October, 1905, a Committee on Standard Rail and Wheel Sections was appointed by the American Railway Association. One fact developed by this committee, previously unknown to many, was that the planes upon which the wheel and track gages were measured did not coincide, one being considerably above the other. The alteration proposed in the wheel section which on the face of it appeared to require a corresponding alteration in certain distances related to the track gage, really did not affect them to any appreciable extent, when the different planes of measurement were considered.

This committee found that in formulating rail sections it must also consider the specifications for the manufacture of rails, and their chemical composition. The relative dimensions of the head, the stem and the base of the rails and the quantity of steel in them, affected the process of their manufacture to a considerable degree. New sections of rails weighing from 60 to 120 lbs. were therefore recommended for trial, as well as certain changes in chemical composition. All of these were decided upon after full consultation with the leading makers of rails and with those considered the best experts on the manufacture of steel.

It would be easy to reason out that the proposed forms of rails were better and safer than any others, and it might be plausibly urged that their use should prescribed by law. But every experienced railway officer knows how many times the desirability of such action in other cases, might have been theoretically demonstrated with equal force, and yet under actual trial, conditions have arisen, impossible to foresee, which have more than offset the advantages otherwise realized. The new sections will therefore be experimented with and their performance watched with the greatest care before any attempt is made to establish them as standard. In this work, the Railway Engineering and Maintenance of Way Association is co-operating.

At various times disastrous explosions have occurred on trains in transit, in cars on sidings and in freight houses, sometimes from known and sometimes from unknown causes. The great engineering and building operations of the country require the use of vast quantities of dynamite and other explosives, and these, to an amount estimated at not less than 500 million pounds per annum, have to be transported by rail. Upon some important lines quite strict rules were provided in order to minimize the danger of transporting such articles. The necessity, however, of providing uniform rules on this subject was evident, since with the great interchange of business

a laxity in the rules of one road might result in an explosion on a far distant line over which the article shipped from the first road was being transported.

So in 1905, a "Committee on the Safe Transportation of Explosives and Other Dangerous Articles" was formed. It called to its aid the best known experts on the subject of explosives on this continent including distinguished representatives of the ordnance departments of the army and of the navy. After very careful investigation a Code of Rules for the Transportation of Explosives was formulated by the committee and approved by the association. After these rules had been tested and modified as the result of experience, another step was taken. The then existing United States Statutes on the subject of the transportation of explosives in interstate commerce, were passed in 1866, before dynamite had been invented, and the regulations as to explosives, under the statute, actually increased rather than diminished the danger in carrying them. So Congress was appealed to and on May 30, 1908, a new and rational law was passed repealing the former statutes. The new law is upon sufficiently elastic lines to provide for future developments and it placed upon the Interstate Commerce Commission the duty of promulgating regulations for the transportation of explosives which would be as enforceable against the shipper as against the carrier. After a full hearing in which all parties interested were represented and careful examination and consideration on the part of the commission, it promulgatetd with but slight verbal modifications the regulations previously compiled and recommended by the Committee of the American Railway Association, and they took effect October 15, 1908. These have been supplemented by the association with such special rules as were necessary to put the regulations into effect in railway service.

It had previously become evident that the danger involved in the handling of explosives, and the care that had to be taken to avoid this danger, was one but little understood by the average railway employee, or official, even on the best organized lines. So a bureau for the Safe Transportation of Explosives was established in November, 1906. It has at its head a chief inspector who, as an army officer, is widely known as an expert on explosives, and two special agents. The whole railway system of the country is divided into sections, each in charge of a local inspector, of whom there are now 20 in service. They have been most carefully selected and drilled in their duties before appointment and their reports to the Chief Inspector are most interesting. They also inspect powder factories and magazines. They have no power whatever to enforce discipline, which must be exercised in all cases by the proper operating officials of the respective roads to whom they also report; but they can stop the movement of a car, or a shipment of explosives, found in a dangerous condition and provide for its safety and they instruct the railway employees in their duties in this particular. The work of the bureau has been most salutary and cannot be too highly commended. About $80,000 a year are expended for its maintenance. It has established a special laboratory for testing articles offered for transportation thought to be dangerous.

Recently this committee, in connection with the same bureau, has formulated regulations for the safe transportation of inflammables and acids, which also took effect October 15, 1908. As it is evident that explosives cannot be safely carried unless care is taken to prevent adjacent inflammable articles from igniting, the necessity of providing rules for handling the latter is evident. By the terms, "Inflammables," articles that will merely burn, like hay for instance, are not included, but those articles not so well known from which vapors arise that will explode when brought in contact with the flame of a lantern. Hay and articles of that nature are so evidently inflammable that a few simple precautions only are necessary to protect them. One of the features in the operation of the bureau is the giving of illustrated lectures for the purpose of instructing both railway employees and shippers as to the necessity of closely adhering to the regulations in order to secure safety in transportation. Great interest has been taken in these lectures and a voluntary attendance of an audience of a thousand persons is not unprecedented.

I have spoken of a freight car as if it were a unit of definite dimensions. Unfortunately for statistical and accounting purposes this is not so. The sizes and carrying capacities of cars have varied greatly in past years and they still vary so that the words freight cars may refer to a vehicle with a carrying capacity of 40,000 lbs. or to one of 100,000 lbs. There are a few special cars of still greater capacity and some old cars, now fast disappearing, of 30,000 lbs. capacity; but these bear but a small portion to the total equipment. The additional carrying capacity is sometimes provided for by increased length and sometimes in the case of box cars by increased size of the cross section. There are a number of reasons why there should be a standard box car, and, in April, 1889, a committee was appointed to consider that question. A careful and exhaustive inquiry was made for the purpose of ascertaining what size of cross section and what length of car would be best adapted to the requirements of the goods to be transported, such as the ordinary sizes of packing boxes for various articles. In October, 1901, this committee reported in favor of a box car with a width of 8 ft. 6 in., height of 8 ft., and length of 36 ft., all inside dimensions and this is now recognized as the standard box car. It should not be understood that all box cars are now built of these dimensions, as that is not the case, although many have been. Some managers consider that larger cars are better adapted to the needs of their special traffic, and a few of these have been built, but, when a standard box car is mentioned, all now know exactly what is referred to.

When an act of Congress was passed in 1893, requiring all freight cars to be equipped with automatic couplers, it became necessary to decide upon a standard height of draw bars, as even if the same kind of coupler were upon two cars of uneven height, they could not be safely coupled. This duty was placed upon the American Railway Association by the terms of the law and the height as required was duly certified to the Interstate Commerce Commission.

The American Railway Association has a standard cipher code for use in sending telegraphic messages. It is not a secret code, but is designed to promote brevity in the wording of telegrams. This was compiled under the supervision of a committee which was appointed in 1902. Its work was completed in 1906, and the code is now extensively used.

The tendency of modern times is very strongly towards the substitution of the power of electricity for that of steam wherever conditions are favorable for its employment. Roads that must continue to use steam, probably for many years to come, have installed electric service on parts of their lines, and in some instances both steam and electric trains run upon the same tracks.

The medium by which the current of electricity is carried along the line is sometimes a third rail, and sometimes an overhead conductor. The exigencies of the service therefore require that certain distances alongside the tracks, and a certain space overhead shall be kept clear for these appliances and for the attachments to the cars by which the current is transmitted to the latter.

Looking to the future when the electric service shall be widely extended, it is very desirable to anticipate difficulties that might arise from insufficient space having been left free for these appliances, which if not provided might interfere with the interchange use of cars and engines. So in 1906, a "Committee on Standard Location for Third Rail Working Conductors" was appointed to examine into this question. The construction of the track, bridges and other parts of the permanent way had to be taken into consideration as well as that of the engines and cars. In April, 1908, this committee pre-

sented its report, illustrated by a diagram, recommending certain lines of side clearances for both rolling stock and maintenance of way structures. It was unanimously approved and made the standard of the association. The requirements of clearances for overhead conductors have not yet been finally formulated but are under consideration.

I have not as yet mentioned the most important committee of the American Railway Association, which is, of course, the executive committee with the president of the association at its head. This committee has general charge of the affairs of the association. It decides whether any new subject suggested is a proper one for discussion, to what committee it should be referred, or what other course should be taken with regard to it. Its influence is, therefore, reflected in the work of all the other committees, and by supplementing that work often makes it more effective.

It has recently had under consideration a reorganization of the committees of the association with the view of providing an arrangement of their work on still broader lines, so as to increase their usefulness; and also, so that propositions of merit originating with and approved by other railway associations, the members of which have not the power to put them in effect, may be referred to one of the standing committees of the American Railway Association for consideration and report. It is intended that certain of the committees shall have chairmen who shall devote their entire time to the work of the association. It also contemplates the establishment of a reference library of railway information. Other important plans have not yet been sufficiently developed to be now commented upon.

One marked feature distinguishes all of these associations—they are absolutely without coercive power to enforce their decisions. In one form or another the same principle is enunciated in their constitutions that is embodied in the rules of order of the American Railway Association, which reads, "Its action shall be recommendatory and not be binding upon any member." The adoption in practice of anything recommended therefore depends entirely upon its intrinsic merit.

It will be noticed in the statements made of the work of the several committees that their actions have all been deliberate. Their general plan of working has been to first secure information as to the methods actually employed on the various roads in the matter under consideration, and to ask for suggestions as to their improvement. Then, after carefully considering these practices and suggestions, to formulate tentative recommendations. These are submitted to the general operating officers of each road and by them to their subordinates whose practice would be affected by the proposed changes, and all criticisms are returned to the committee. When the report takes its final shape it is again submitted to criticism on the floor of the convention. If great differences of opinion are developed the report will be referred back to the committee, generally at its own request, for further consideration.

When, therefore, a committee makes a final report the subject has been so thoroughly digested that it is, as a rule, approved by the association without much further opposition. If, however, it is a subject of great importance, a letter ballot will be ordered even when those present are ready to act favorably, and such ballots generally require a two-thirds majority for the adoption of the proposed measure. Under this plan of working it will be seen that any recommendatory action of the association has great moral force. Few managing officials will fail to put its recommendations into effect, and one who disregards them in any essential particular is likely to find himself sooner or later in a hazardous and unenviable position.

A BIT OF WISCONSIN SCENERY.

The serpentine freight train shown in the accompanying engraving, reproduced from a photograph, is one of the Chicago & North Western's. It consists of an engine, 55 cars and a caboose. Forty of the cars were loaded, and the estimated weight of the whole—loaded and empty—was 1,629 tons. The scene is near Ableman's, Wis., between Baraboo and Elroy, and the train is moving northward.

Rounding the Curve at Ableman's, Wisconsin; Chicago & North Western.

THE VALUATION OF RAILWAYS.

II.

The foundation for rate-making afforded by a valuation is believed to meet successfully all the foregoing requirements: to mark the line of separation between the obligations and the rights of carrying corporations in this particular, and to fix a definite basis for revenues. Not improbably it is the only one that does; certainly no method inconsistent with it will stand the test of reason and of law. It is not too much to say that these rights and obligations have never been adjusted to a basis of absolute equity, and it would be visionary to predict that they ever will be or ever can be so adjusted; but it is not the part of wisdom or of expediency to regard with contempt a measure affording practical relief because it is not ideally perfect. "What the traffic will bear" may be economically sound. Although the meaning of the clause has been so wilfully misrepresented that perhaps to the majority of intelligent and well-meaning persons it is synonymous with extortion, the principle is approved by leading authorities on the subject. (Reference: See e. g., Hadley: Railroad Transportation, pp. 17, 76, 123 and 124.) But its province appears to consist more in the adjustment of individual rates to a system than in determining the level of the system itself.

However firm one's reliance upon the essential integrity of the American people and the sense of justice inherent in them—a reliance that is fully warranted by a long and honorable record—there is no valid reason to expect that the popular demand for reduced rates and fares will undergo any permanent abatement until arbitrary judgment, caprice or prejudice, as a basis for governmental rate-making and rate regulation, gives place to a method at once practicable, rational, scientific and mutually just. Unrest, agitation and change are the conditions of progress; and to acquire as cheaply as may be is a necessary law of trade. Men are subject to leadership and to the influence of their leaders, which, if it were always scrupulous and honorable, is not at all times wholesome and wise. The field for the mere politician, the demagogue and the agitator is too fruitful to be abandoned lightly. All too frequently the hands of those exhibiting conspicuous evidence of essential statesmanship are to be found joined with those of the agitator for gain. Provoked or unprovoked, these influences asserted themselves and gained ascendency over the sober judgment of the people in the days of the Granger laws (Reference: Hadley: Railroad Transportation, pp. 134 and 135.); it has been so since that time; and there is no guaranty or assurance that it will not be so again at any time hereafter.

It is the special character of a Republican form of government that under it an evil must be brought forcibly home to its citizens and that injury must be sustained before an effective remedy can be applied. Approaching evils are not always clearly discerned; when they are they can seldom be forestalled. This is the course over which the problem of rates seems destined to travel; but the prediction is made with confidence that within a comparatively few years the railroads will be arrayed almost as a unit in advocacy of the valuation of their properties.

Briefly, therefore, the great immediate advantage which may rightfully be expected to accrue to a carrier from an official valuation of its property is that thereby it will be enabled to meet the proposition to impose any unequal or excessive burdens upon it, especially such as affect its gross or net revenues, by claiming the benefit of its rights and immunities under the Constitution and laws. The immediate practical benefit to the state and to the public lies in the fact that, the rights of the carriers being defined, they will be deprived of the pretext or the means of exacting more than their rightful due through the imposition of excessive rates and fares, and of evading their public obligations as regards the sufficiency of service or otherwise. To this principle—a principle which it seems otherwise impossible to enforce—there can be no valid objection.

But beyond such immediate advantages, there is involved a question of expediency of no less practical importance. The table which follows is as impressive as any comment upon it.

Statistics of Railroads Reporting to the Interstate Commerce Commission.

	1906.	1896.	Increase—Amount.	Increase—Per ct.
First track	222,340.30	181,982.64	40,357.66	22.18
2d, 3d & 4th track	20,981.98	12,439.76	8,542.22	68.67
Yard trk & sidings	73,760.91	44,717.73	29,043.18	64.95
Total miles	317,083.19	239,140.13	77,943.06	32.59
Locomotives	51,672	35,950	15,722	43.73
Passenger cars	42,262	33,003	9,259	28.06
Freight cars	1,837,914	1,221,887	616,027	50.42
Passenger miles	25,167,240,831	13,049,007,233	12,118,233,598	92.87
Ton miles	215,877,551,241	95,328,360,278	120,549,190,963	126.46

Passenger traffic has almost doubled within a decade, freight traffic has considerably more than doubled. As previously observed, the limit of capacity in the transportation system has already been reached. We are not permitted to doubt that the country is just now pausing and acquiring force for another and still more notable stride in advance. At the rate of increase already established it is estimated that, in order to keep pace with the demands of commerce upon them, the railroads of the country will require upwards of half a billion dollars of additional capital annually for years to come; to be employed in the construction of new lines, the extension of existing ones, the establishment of more commodious terminals, double-tracking, the correction of curves, the revision of grades, the acquisition of equipment, and in a hundred other ways.

A large number of railway companies have found it necessary to curtail dividends; others still have been compelled to pass them altogether. Surplus revenues, where there are any, are wholly inadequate to the need. The experiences of the past few years, industrial, economic and otherwise, afford little incentive to extension were the means available. New construction or improvement, on any considerable scale, is paralyzed pending a change of condition. With a plentiful supply of loanable capital at low rates of interest, and with the enlarged needs of to-morrow for transportation staring them in the face, only those roads enjoying the highest credit have been bold enough to attempt new financing.

Whether the necessary funds can be attracted will depend wholly upon the fairness, to make no mention of liberality, accorded to capital invested in transportation undertakings. Failing to enlist fresh capital, there can be nothing more than sporadic and insufficient provision against the traffic of only a few years hence. Thus would an effectual check be placed upon the further development of the material resources of the nation, to the serious injury of every form of industry and trade dependent directly or indirectly upon transportation.

When any far-reaching measure is proposed, for which there is not ample successful precedent, there is never wanting a small army of good, substantial, but ultra-conservative and timorous people, to cry aloud in concert, "the thing can't be done." It is nevertheless true that if a railroad corporation really wishes to sell its property and plant, and another wants to buy, a valuation can be placed upon it which, if not mutually satisfactory, is mutually acceptable. A corps of experienced engineers, working under proper instructions or untrammeled by instructions, can approximate with remarkable accuracy the cost of a projected line. Assisted by the records of facts already accomplished and of expenditures already made, the approximation of legitimate cost or value will be closer yet.

In those cases where there has been impairment of original investment, or where original investment was deficient as compared with capitalization and the deficiency has not been made good from revenues, determined opposition may be expected. But in the minority of instances where this condition probably

prevails, the public interest will be served by a valuation as effectively, at least, as where a contrary condition obtains.

The most valid and steadfast objection is founded upon the apprehension lest a just valuation shall not be reached, by reason either of incapacity, intellectual bias, or a deliberate intent to wrong. The problem must be solved, not upon political considerations, but upon sound economic principles. There is not a dearth of capacity nor of intregity in this country, and when the time is ripe it can be drafted in the interest of a solution to this intricate and perplexing problem. The duty can only be entrusted, and will only be entrusted, to experienced technical and practical men without preconceptions or prejudices to vindicate, without selfish personal or political ends to attain, and who are beyond the allurements of dishonest gain. In such hands the state, the railroads and the investing community may look with equanimity to the outcome.

The most familiar form of appraisal, or valuation, made for purposes of investment but strongly advocated as the basis for capitalization, is in its essence if not in form a funding of net earning capacity or of gross corporate income. The questions which concern the bondholder or shareholder are, whether a company is able to meet its contractual obligations and leave a satisfactory margin of profit; whether earnings are stable, and the tendency is toward improvement or the reverse. In the subject of cost, original or subsequent, or of appraised valuation, he is little interested except in so far as it bears upon the probability that interest and dividend requirements will be met. Frequently, indeed the physical aspects of a property are subjected to severe scrutiny; but always with the object of ascertaining whether it is maintained in a condition to enable continued efficient service and to meet competition—that is, with a view to forming an intelligent opinion as to the continuity and stability of revenues.

Too often the creditor or the stockholder is indifferent to impairment of capital investment unless his immediate interests in the respects indicated are thereby visibly and palpably affected. Nor is such an attitude, not involving neglect of duty or the evasion of responsibility, as untenable as it appears upon first view. The security of the holder of a first mortgage railroad bond, for example, consists in the claim which he has upon net revenues. To be sure, he has a prior lien upon real property, and probably upon personal estate as well; but for uses other than transportation its value is nominal in comparison with the debt placed upon it, and for transportation uses net earnings are the measure of its value.

If there were assurance that revenues could be maintained, this basis would answer the requirements of the investor. As to those upon whom charges for transportation rest and as a guide to determination of the level of a schedule of rates, it is unsatisfactory, not to say wholly lacking. To conclude that, because a carrier is earning a certain sum, it is entitled to be capitalized for a given amount, and because of the capitalization thus reached its rates and fares should be such as to yield the sum first stated, is nothing less than absurd.

A further method proposed, which concurrently with other methods of valuation may be very enlightening and helpful, is that of comparison with another transportation plant similarly situated, as an assumed standard. This proposal is open to the objection that similarity of condition is so vague and uncertain as to warrant only the most general deductions, and that exact likeness of condition wth respect to transportation lines is so rare as to be practically nonexistent. The comparison of one uncertainty with another, or the comparison of an uncertainty with an established certainty under a mere assumption that the conditions affecting them are similar, is altogether too inexact and unreliable to be made a criterion in the defining of property rights and in their safeguarding.

In any systematic effort at valuation, cost is a matter for early consideration. If legitimate cost can be determined with accuracy, it can usually be relied upon as establishing a fair presumption of value. But here an intricate situation presents itself, and in the ascertainment of railroad cost many serious difficulties will be encountered. Some managers and accounting officers profess, with a convincing show of reason, inability to determine with any considerable degree of precision what their properties have cost. A few of the roads have been in existence for three-quarters of a century. In the earlier days there was no accounting organization worthy of the name. The science of accounts was undeveloped, the art was practiced with a laxity that is now difficult to comprehend, and there was little more than accidental uniformity of method. Such records as were made have, in many instances, been lost or destroyed. Consolidations have taken place, reorganizations have been passed through, and purchases have been made, under foreclosure or otherwise, at a valuation either greater or less than original cost. Capital assets acquired at one price have been replaced at another and different one. Operating cost and capital expenditure have been hopelessly confused. Finally, funds available for distribution have been withheld from shareholders and devoted to increase of capital investment and the improvement of facilities for transportation. To what extent these and other similar things have occurred, and to what extent actual investment has been increased therby, are questions it would not always have been easy to answer at the time; now it is all but impossible.

All tangible property essential to provision for the service which it is the duty of a carrier to provide and render, at its reasonable and necessary cost, is properly subject to capitalization, enters into and forms a part of the legitimate value of a company's plant and equipment; and what is true of tangible property is likewise true of intangible property to the same extent and with the same limitations. A franchise that costs nothing is the proper subject of capitalization only at a nominal value. If, in order to comply with the condition of obtaining a franchise, expense is necessarily incurred, such expense is an element of cost. The municipality, therefore, that sells a public service franchise is borrowing at an expensive rate of interest.

There is considerable diversity of opinion as regards the proper treatment of discount on securities sold. There is a distinction between bonds, representing corporate indebtedness and having a definite limitation as to the time of their redemption, and share capital, representing ownership and which as a rule is irredeemable. In relation to the former, there can be but one tenable view. If a company can market its 50-year 4-per cent. bonds at 90 per cent. of par, it means that the company's credit is on a 4½ per cent. basis; that it could market a like security paying 4½ per cent. at par. If it elects to issue at the lower rate it is merely sacrificing principal for the sake of a reduction in the annual interest charge; in other words, it is prepaying interest which would accrue during the life of the issue. If $10,000,000 par value were issued at 90 per cent., the discount would amount to $1,000,000, and the saving in interest to $50,000 per year, or $2,500,000 in 50 years. Obviously the company cannot claim the privilege of capitalizing the discount, while thereby availing itself of the reduction in interest. If such a course were legitimate in the case of a 5 or 10 per cent. discount, it would be equally so if the discount were 50 or 75 per cent., when the absurdity of the proposition would be perfectly apparent. The somewhat general practice of prorating the discount, as a charge against revenues, over the term of the obligation's existence is sound; but this should be done, not in equal installments, but on the basis of the appreciated value of the bond as it approaches par at maturity. There is no apparent objection to charging discount of this nature in a ump sum against an accumulated surplus. The capitalization of discount on stocks, involving as it does the introduction of fictitious values in capital assets, is wholly indefensible.

The official classification of accounts authorizes the capi-

talization of bankers' commissions for the sale or underwriting of capital issues. This is liberal to the carriers, but it is not subject to serious criticism. It is doubtful, however, whether the courts would allow such commissions as capital actually invested and employed for the public convenience. The better practice, it is believed, would be to refrain from capitalizing such items, restricting capital charges to cash actually invested and to property acquired at a cash valuation. The shareholders, on the contrary, are not called upon ultimately to bear this expense. It ought to be reimbursed to them in the annual rate which they are allowed to earn upon their investment.

There can be no doubt that interest accruing during construction is a legitimate capital charge; further, there is good reason to conclude that a company might rightfully assess such interest at a rate corresponding to the reasonable return which a carrier is entitled in law to realize from its service to the public; a rate, say, approximating 10 per cent.

The inclusion in cost of the expense of transportation, foreign and domestic, of persons and material during the period of construction is officially authorized. It is not universally conceded that the cost of domestic transportation incurred after a road is turned over to the operating staff complete or in condition for the performance of service, constitutes cost, though it is not plain wherein a different principle is involved. This qualification, however, should be noted: that a carrier, already earning the return upon its investment to which it is rightfully entitled, would, by thus augmenting its investment, be imposing an additional tax upon its patrons, the equivalent of a higher rate of return. But in this respect and with the qualification stated, subsequent construction, additions to and betterments of roadway, structures, equipment, etc., appear to rest upon the same foundation as original construction, for the reason that they are subject to capitalization. Perhaps it is superfluous to remark that the expense of transportation does not include any element of profit to the carrier immediately concerned.

A conclusion contrary to that stated above would result in disparities in the weight of capitalization within sharply-defined territorial limits, and, on the theory of a fair return, in the level of charges imposed upon the shipping and traveling community; which might tend to accentuate the advantage of consolidation to sections remote from distributing centres for railroad material, and thus to stimulate further centralization or in extreme cases to discourage extension of the railroad system.

Instances are not lacking wherein a road has paid regular rates of transportation on construction material to a neighboring line, and then been absorbed by that neighbor, thus by possibility incorporating revenues accruing to itself in the construction accounts of the purchaser. Meanwhile, these revenues presumably included a margin of profit, which in turn may have been expended wholly or in part in improvements, added to the cost of property, and capitalized.

On the contrary, if the test of the right to capitalize expenses of this nature be that a carrier is not otherwise realizing an equitable return, the result might be to enlarge the capitalization of these roads which, by reason of competition, sparse traffic, or other impediments, are least able to bear it. This topic will be referred to further in another connection.

It is apparent that the transportation of materials entering into maintenance and operation is a charge against current revenues; the assessment of revenues upon them by the home road would conduce to no useful end, and is not justified.

A line of road is constructed at a given actual outlay. Its projectors failed to foresee the developments that make for heavy traffic, or if they foresaw them conditions changed, much as the completion as the Panama canal promises to modify currents of traffic in this country, not in the first place well defined, and in some cases created; in consequence the road is inadequately maintained, becomes insolvent, and is acquired by another carrier at a fraction of the original cost. The question arises whether the new proprietor is entitled to earn a lawful rate of return upon first cost, or whether it must restrict itself to such rate upon the purchase price. Then modify the hypothesis and assume that the location of the line constructed was wise and fortunate; that its traffic was heavy, its revenues ample, and its maintenance on a liberal scale; and that then it was incorporated into another system at an appreciated valuation. Shall purchase price or original cost determine the rate of return? It would appear that, whichever consideration is adopted as governing in the one case, it ought in equity and by a parity of reasoning be controlling in the other. The value which may attach to a transportation property as part of an organized system, over and above its value as an independent enterprise, sometimes called franchise value, may warrant the expense of bringing together the component lines under a common control and management. Consolidation tends to efficiency of service and economy of operation. But if this principle be adopted, what should be the limits of its application? Certainly such expense should be admitted to capital accounts with caution.

The foregoing suggests the wisdom and the propriety of effective exercise by the governmnt of supervision and control over the incorporation of lines of transportation, with a view to prevention of economic waste through the construction of lines not demanded by traffic actually offering or in reasonable prospect, whether in competition with existing routes or not. The soundness of this proposition in its application to new lines, as a theory, will stand every test; but in practice there is grave doubt whether any body of men could be designated that would be more capable of interpreting tendencies and of foreseeing future developments and needs in this respect than the trained practical transportation men upon whom the responsibility has heretofore devolved. It is not improbable that any committee of ordinarily conservative persons would have refused on these grounds to authorize the location of some of the great railroads which have proved to be conspicuously useful.

What shall be said of locomotives costing $25,000 each that have served their purpose and been replaced by other and more efficient ones at $15,000; of the supplanting of rails costing $50 per ton by others at $25 a ton; of the substitution of freight cars costing $750 each for those which cost $250.; etc., etc.?

The substitution of a thing of lesser value for a corresponding thing of greater value, has the effect merely of changing the form of assets. If due provision for maintenance has been made, the difference is converted into cash, credit, or other thing of value, subject to employment for transportation purposes. But it is important in all such transformations that the bookkeeping method should reflect the fact. In the renewal of locomotives instanced above, the equipment account should be relieved of the difference in cost and value.

The substitution of a thing of greater, for a corresponding one of lesser value, represents improvement and constitutes additional investment; and, whether capitalized or not, it is on a parity with original investment. This principle, however, should not be accepted without qualification. When such an article of current supply as a crosstie at a cost of 30 cents is renewed at 60 cents, few people would undertake to justify capitalization of the difference in cost—unless the new tie had been treated with a preservative, were wrought of metal, r for other possible reason possessed greater utility than its predecessor. The better practice is to treat such differences as a charge against revenues.

The maintenance of a railroad or of any other property, rightly understood and strictly defined, implies the full compensation from current revenues for waste in capital investment, whether from use, decay, obsolescence or other cause,

either through actual expenditure or through the creation of reserves; anything beyond this is betterment. The classification of operating expenses promulgated by the Interstate Commerce Commission aims at this result, and so far as concerns equipment is well adapted to its attainment. But the issue of that classification thus defining maintenance became effective as late as July 1, 1907. Prior to that time its adequacy or inadequacy was made to depend in a large measure upon such considerations as the judgment of the board of directors, the company's supply of cash or other liquid assets, the continuance of dividends at an established rate, and the like. While, under this regime, some carriers no doubt failed in the full and complete maintenance of their plants, it is certain that a large number of others maintained theirs at an extensive rate. The conservative view taken of maintenance by the officers of roads whose revenues justified, has been not only that their physical plants should be kept at their original value or standard of efficiency, but further than this and in a spirit of wholesome rivalry, that a carrier should be kept in condition to transport traffic as expeditiously and inexpensively as its competitors; charging to the cost of operation many items of addition or betterment, new construction or road acquired. This theory of maintenance has been held in such high esteem as to be regarded as the mark of conservatism and merit in administration. It is not to be implied that there is objection to the upbuilding of the railroads from revenues. Within reasonable limitations it is in the interest alike of the carrier and of the public which it serves, and is highly commendable; but it is important that the distinction between expense and investment should be clearly drawn. This course is enjoined not merely as a matter of adherence to correct principle; it is dictated by the most superficial considerations of expediency and self-interest—a fact that the carriers have failed to their own serious detriment to perceive, or perceiving they have failed to appreciate.

It has long been the systematic practice of many of the railroad companies to appropriate to the same ends such large sums from income as their profits warrant—tantamount to the payment of dividends and the subsequent assessment of capital stock to the same amount. Some profess inability to understand how a stock whose value is fictitious, wholly or in part, may rightfully earn a profit on the excess above actual investment. But if the capitalization of a carrier is made up of bonds and stocks in equal amounts, the former only representing bona fide cost; if it has the right to a yield of, say 10 per cent. upon its investment; and if its borrowed capital costs only 4½ per cent., there will remain a profit to such carrier of 5½ per cent., subject to distribution among its shareholders. If there were original or subsequent investment in addition to the par value of bonds, if bond interest were at a rate less than 4½ per cent., if earnings were in excess of 10 per cent., or if the proportion of stock to total nominal capitalization were less than one-half, the effect would be more pronounced than here illustrated. Such increment to first cost is in its turn entitled to reward. The effect is cumulative, and if the practice is long continued it may result in the complete elimination of fictitious value. There is good reason to believe that in particular cases even more has been accomplished.

Conflicting opinions are entertained with respect to the status which should be assigned, in connection with a valuation, to donated property—right of way, station and terminal grounds, government land grants, and the like, to which no considerable cost attaches. Is it proper that it should be made a constituent of that value for the use of which the public may be taxed in the interest of the donee? If so, should it be appraised at its full worth in the market, or only at the cost to appropriate it? Is a grant of land, which must be converted into cash and re-converted into transportation property, different in any important particular from a gift of right of way, which enters directly into the transportation plant? Is the case affected by the origin of the gift, whether public or private, or by the consideration that it is devoted to a public use? It may not seem consonant with the principle that cost only should be capitalized, and sentimentally it may not seem fitting that the public should be assessed for the use of that which it has donated to a private corporation to be employed in the public service; but, much as one might incline to the opposite view, it is difficult to escape the conclusion that donated property ranks at its cash equivalent with that purchased or condemned. Upon conveyance of the gift estate title vests in the donee; if there are no qualifications, such title is absolute; and the use of the property, and the right of enjoyment of the profits arising from it, are necessary incidents of ownership.

It would be futile to deny, and in fact there is no serious effort to deny, that the property accounts of railroads have been unduly enlarged by charging to them fictitious items or items at a fictitious valuation; at their inception, at the time of making capital issues, and in connection with acquisitions and consolidations. To admit that "watered" railroad stock or bonds ever existed to any considerable extent, is to affirm this. Attempt is made to justify the custom on the ground that it was necessary in order to preserve the credit of the companies. This, if admitted, leads to the startling conclusion that misrepresentation is a proper basis for credit. Moreover, it was a deceptive device that deceived nobody in a quarter from which benefit might be expected. On the contrary, it served effectually to place railroad securities under a suspicion from which they have never fully recovered. This error was followed up by the practice, equally unwise and short-sighted, of adding to capital investment and building up property values without reflecting the fact in the accounts; at the very time that their public arraignment on the charge of overcapitalization was responsible for most of the woes that they lamented. But over against the fact of excessive capitalization there can be set a multiplicity of offsetting conditions heretofore sufficiently illustrated.

Prescience has never been a distinguishing characteristic of humanity, and it is too much to expect that it ever will be; but with the enlightenment of experience to serve as a guide, it is not too much to expect that the many errors which have gone before will in due course be righted.

While ascertained legitimate cost operates to raise a presumption of value, it is not thereby fully and finally established. On the one hand, investment may have become impaired; on the other hand, there may exist values in excess of cost, due to appreciation, or values acquired by indirect outlay, such as good will, an established capable organization or efficient operating body.

A farmer, we shall say, acquires a tract of land for $10 per acre. He may cultivate it, realizing such profit each year as is possible, or it may remain unimproved and virtually untouched. A few years later he finds that it has a value of $25 an acre. The country has gone forward in commercial and industrial development, the population has grown, and property values generally have increased. Not improbably, as has frequently been the case, the enhancement resulted largely from the facilities provided and the service rendered by the carrier. Estimates emanating from sources which command respect are that the farm values of the country have increased 50 per cent. within a decade. Is the railroad entitled to participate in the enhanced valuation? If not, does the act of withholding the privilege constitute a discrimination against railroad investment? Is the carrier sufficiently compensated by the enlarged movement of traffic? Certainly not if, by legislative act or the orders of regulating bodies, rates are so reduced as to disturb a proper relation between revenues and the expense of operation. Are its cross-country lines, having relatively small dismantled value, and its terminals and other property in cities and environs, having a large and increasing commercial value, on a parity in this respect?

(To be continued.)

General News Section.

The block system has been re-established on the Atchison, Topeka & Santa Fe between Pueblo, Colo., and Dodge City, Kan., 266 miles.

The Chicago, Milwaukee & St. Paul has bought a tract of coal lands in the Bull mountain field in Yellowstone county, Montana, near the Pacific coast extension, and has opened two mines.

An officer of the Great Northern writes that the management of this road has been investigating the A B C train despatching system, but, contrary to newspaper reports, has not decided to adopt it.

In the federal court at Galveston, January 20, the Missouri, Kansas & Texas was found guilty of violating the safety appliance law, in using a car on which there was a defective coupling, and was fined $100.

An officer of the San Antonio & Aransas Pass writes that this road is securing about 25,000 catalpa speciosa trees from Carney, Ala., and will plant them on a tract of land near Skidmore, Bee county, Texas, about 45 miles from the Gulf.

The Michigan Board of Assessors has completed its tentative assessment for 1908 of the properties of railway, express and car companies in Michigan. The total valuation of these properties is fixed at $211,368,250, as compared with $209,404,300 in 1907. The valuation of railway properties is increased from $207,130,000 to $208,967,000.

According to a press despatch from Mexico City, the Mexican government will spend a large sum of money on a monument to Jesus Garcia, a locomotive engineman at Macozari, Sonora, who, on November 7, 1907, coupled to a car of burning dynamite and hauled it out of town, thus saving many lives. The car exploded and Garcia was killed.

The Railroad Commission of Washington states that of the valuation placed by it on the Great Northern in Washington 55 per cent., or $32,767,466, should be allocated to interstate business, and 45 per cent., or $26,809,745, to intrastate business. The division of values is based by the Commission on what it estimates to be the relative costs of handling intrastate and interstate traffic.

F. W. Whitridge, receiver of the Third avenue (surface) street railway, New York City, has asked the state legislature to pass a law to kill off "ambulance chasers." Ambulance chasers are lawyers who try to make a living by taking up the cases of persons injured in the streets. They are constantly prosecuting suits against street railways. Mr. Whitridge proposes that when an attorney takes a case expecting to get his pay out of the damages recovered, the attorney himself shall be held liable for the costs.

Press despatches from St. Lake City, January 16, reported that the Southern Pacific line from Ogden westward, for the first time in its history, had been closed to traffic on account of washouts. The washouts were west of Sparks, Nev. Through trains were sent from Ogden to the Pacific coast by way of the Salt Lake route to the south and by the Oregon Short Line to the north. Press despatches of January 22 reported Spokane, Wash., cut off from the cities both south and west by breaks in the railways, due to thaws and heavy rains.

Complaint has been made to the New York State Public Service Commission, Second District, by R. W. Lowe, a former telegrapher, against the Delaware, Lackawanna & Western, charging it with violating the law limiting the working hours of telegraphers. It is charged that at Norwich the station office is kept open from 5.45 in the morning until 1 o'clock the following morning, and that only two operators are employed. One of the operators works from 5.45 a.m. to 5.45 p.m., and the other from 1 p.m. to 1 a.m. It is also charged that the law is violated at other stations.

The town of Greensburg, Pa., has become so very short of water, because of the long-continued drought, that the Pennsylvania Railroad has made a connection between its own pipe line, laid some time ago to supply locomotives, and the pipe lines of the water companies which supply the town, and has notified the water companies that the road will give water to meet the necessities of the citizens free of charge, so long as this can be done without crippling the operation of the railway. Over 35,000 people were in danger of being without water for either domestic or fire purposes, and the railway company felt in duty bound to give what assistance it could; but in making the offer President McCrea stipulated that the water must be given free of charge to the consumers. The question might be raised whether the railway had the right or power to sell water.

President Shonts, of the Interborough Rapid Transit, has again written to the New York State Public Service Commission proposing to sell the Steinway tunnel to New York City. This tunnel, which extends across the East river from 42d street, Manhattan, to Steinway on Long Island, was completed several months ago, but remains unused because the owners are in doubt as to the validity of their franchise. Mr. Shonts now proposes that the city pay for the tunnel $7,239,000, which is the same price as that formerly asked, but he withdraws the proposal to operate the tunnel in connection with the street railways in Queens county. Or, if the city will not buy, the Interborough will ask for a franchise, with a view to operating the tunnel; but in that case will not agree to carry passengers for less than 5 cents for the tunnel proper. The original offer contemplated 5-cent fares through to points in Queens county beyond the eastern terminus of the tunnel.

Employees Got All the Net Earnings.

Certain grateful employees of the Georgia Northern have given out an unusual story. On New Year's day about 50 of them were guests of President and General Manager C. W. Pidcock at his home in Moultrie, the occasion being a "state dinner." They were the regular conductors, engineers, firemen and station agents with the exception of those whose duties made it impossible for them to be present. As the guests were leaving each was handed an envelope, and each envelope was found to contain a check. It appears that when the officers of the railway came to cast up accounts at the close of 1908 they found, as did the officials of most other roads in the South, that the year had not been a particularly successful one. The net earnings for the year amounted to about two or three thousand dollars. The officers then put their heads together and resolved somewhat to this effect:

The net earnings are not sufficiently large to do the company any good. Divided among the employees the amount will help many of them over some rough places. Therefore the employees shall have it. Thereupon the total amount was duly appropriated among the conductors, engineers, firemen, station agents and certain other employees, and a check for the proper amount was made payable to each.

The Georgia Northern, formerly the Boston & Albany Railroad of Georgia, has seven locomotives, nine passenger cars and 33 freight cars; gross receipts for the year ending June 30, 1907, $221,620; dividends that year $60,000.

Illuminated Landmarks and Slow Boards.

A noticeable feature on French railways is the use of translucent ground-glass signs, one being placed about 1,200 meters in the rear of the distant signal at every point where a route diverges, bearing the word "Bifur," an abbreviation of bifurcation. Signs of this type are also used to indicate the ends of all stub tracks, displaying in large characters the words "Voie d'impasse"; bumping posts also being indicated by the same type of sign with the words "Heurtoir d'impasse." These same ground-glass signs with black numerals are used to indicate the permissible speed, in kilometers per hour, wherever

slow signals are required, a plain white board with a white light being used to denote that full speed may be resumed. These translucent signs are illuminated at night.—*I. C. C. Report.*

The Prospects of the Atlanta, Birmingham & Atlantic.

In a pamphlet issued to stockholders, H. M. Atkinson, President, and who was recently appointed receiver, says in part:

October, 1908, was the first full month that the completed mileage of the A. B. & A. was operated. The panic conditions of the past year not only delayed the completion of the road, but seriously affected its earnings, making it impossible to meet all of its obligations. The directors of the company felt that by putting the road in the hands of receivers it could be operated to better advantage and held together, which would be best for all the stockholders and its creditors. The earnings of the road are now increasing rapidly, and it is believed that the receivers will be able to build up its earnings within a comparatively short period so that plans can be worked out providing for all its obligations and stockholders.

The company has issued $25,000,000 common stock; $10,000,000 preferred; $18,533,000 first mortgage 5 per cent. bonds, and has outstanding equipment obligations amounting to $2,789,169, and has guaranteed principal and interest $3,000,000 bonds of the Georgia Terminal Co., and $2,445,000 bonds of the Alabama Terminal Railroad Co.

Mileage of the main lines in operation on January 5, 1909, are as follows:

Brunswick to Pelham	429.4 miles
Pelham to Birmingham (under contract with L. & N. Railroad)	19.0 "
Manchester to Atlanta	78.0 "
Fitzgerald to Thomasville	80.5 "
Waycross to Sessoms	26.0 "
Pyriton to Ashland	7.1 "
Total operated main line	640.0 miles

Earnings for Year Ended June 30, 1908, Covering an Average Mileage Operated of 491.2 Miles.

Gross earnings from all sources	$1,720,494.34
Operating expenses	1,157,142.21
Total net income	563,352.13

Earnings for the Five Months Ending November 30, 1908, with Comparative Figures for Corresponding Period of 1907.

	5 months ending Nov. 30, 1907.	5 months ending Nov. 30, 1908.
Gross earnings from all sources	$844,194.29	$882,369.24
Operating expenses	604,048.88	586,410.76
Total net income	$240,145.41	$295,958.48

In accordance with contract dated November 1, 1907, between the Atlantic & Birmingham Construction Co. and the Atlanta, Birmingham & Atlantic Railroad, the construction company as part of the expenses chargeable to it, on account of the unfinished condition of the work and the interference by its work with the operation, paid each month from November 1, 1907, to November 1, 1908, to the railway company, the portion of the operating expenses that equaled the excess of the total operating expenses above 70 per cent. of the total operating revenues. This contract terminated on November 1, 1908, and not until then did the railway begin its regular independent operations. The steady increase in earnings is encouraging, and it is believed, permanent. The road is only just in position to take advantage of its opportunities. Under the protection of the court and the aid which the receivership will afford, it is confidently believed that the road will work out in satisfactory shape.

In a report by P. J. Flynn, Traffic Manager of the Delaware, Lackawanna & Western, on the condition and traffic possibilities of the Atlanta, Birmingham & Atlantic, to Percy R. Pyne, published in the same pamphlet, Mr. Flynn says in part:

The expense of conducting the entire traffic department is not at all excessive. The freight service is adjusted to the requirements of the traffic, thus enabling the A., B. & A. to compete freely with its neighbors.

Before going South I wondered what the roads reaching the lumber tracts would do for traffic after the lumber had disappeared. I found that other traffic, principally cotton, had succeeded the lumber. Aside from the traffic moving between points on the A., B. & A. proper, the road is in position to, and does, handle considerable business to and from other territory, having junction points and pro-rating arrangements with nearly all Southern roads.

An arrangement which will bring to the port of Brunswick grain and other traffic from Western territory for exportation is very necessary. I learned that the management had this in hand.

The foreign freight department recently organized, and inexpensive to the company, should prove a valuable adjunct to the traffic department.

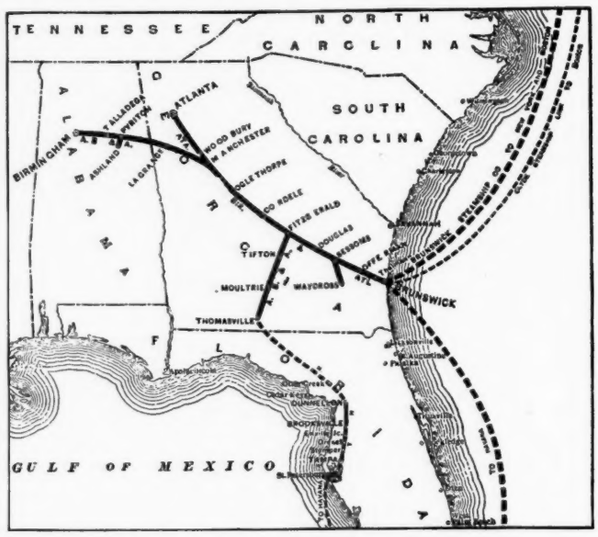
I suggested to Mr. Atkinson the importance of having an industrial agent to present to the manufacturer and the home-seeker the advantages offering along the line of the A., B. & A., and he made a note of it at the time.

I feel that great credit is due to the management for acquiring land for future development, such as for extension of facilities at stations and terminals, location of industries, etc., and at a time when it was available and comparatively inexpensive.

As the quantity of traffic to be obtained or the value of it to a carrier cannot be predicted, because of unforeseen conditions, an illustration of which we had a year ago, I felt, before reaching the road, that it would be very unwise to attempt any estimate. Now that I have been over the property and having carefully observed all conditions and possibilities, I can not refrain from saying to you that I firmly believe that the financial success of the enterprise is fully assured and that, with no great stagnation of industry, the revenue of the road ought to reach $6,000 per mile between now and January 1, 1910, and continue increasing perceptibly thereafter.

Sleeping car service of the Pullman Company is being operated on the night trains between Atlanta, Ga., and Thomasville, under the usual form of contract and is almost self-supporting. Service of this kind not yet warranted in other territory.

There is no through car passenger service in connection with other roads, but efforts are being made to establish same to a limited extent.



The Atlanta, Birmingham & Atlantic.

The present style of locomotives, road and switching, is well adapted to the requirements. The supply of road locomotives will have to be increased soon. The general shops built at Fitzgerald are wholly adequate for all general and heavy overhauling of the road. The passenger equipment is new and modern in every respect. The supply could be increased to advantage as it has been found necessary to hire coaches from other roads to care for special excursion traffic offering at intervals. The condition of equipment generally is very good, the percentage of it in shop from time to time being very low.

There is no large surplus of freight equipment and the present supply should care for $50,000 additional business.

The terminal property at Atlanta, comprising about two hundred acres, is well situated and ample to meet all future requirements of the company, such as yards, shops, stations, etc., with considerable land to spare for the location of industries producing freight traffic. Sufficient of this property has been improved to take care of a good volume of freight traffic to and from Atlanta as well as interchange with connecting roads. The company is now receiving about $30,000 per annum from tenants on the property who have not been disturbed to date. The acquirement of this property for terminal purposes gives the company marked advantages over the other roads reaching Atlanta.

The company uses for passenger traffic to and from Atlanta the Union Depot of the Western & Atlantic, Seaboard Air Line, Louisville & Nashville and Georgia railroads, under the usual form of contract. This depot is centrally located and the above named roads are natural connections of the A. B. & A.

The Brunswick terminals (land and water) cover a large area and additional land has been procured for future development.

The whole layout including the city freight and passenger stations is well located and a belt railroad, owned by the company, reaches the principal industries and wholesale houses, also a large acreage of unoccupied land suitable and available for industrial purposes.

The company is not yet operating to Birmingham over its own rails, using the tracks and terminals of the Louisville & Nashville, connecting at Pelham, Ala., a distance of 19 miles from Birmingham.

The company has terminal property in Birmingham conveniently located and ample for all future requiremeuts.

The opening of the new line through a territory exceedingly rich in natural resources and now awaiting active development must of necessity call for additional outlay on the part of the company, such as tracks to industrial plants locating, switching service, station facilities, etc., and this before receiving any returns from the traffic to be moved.

To ascertain the exact total operating expense prior to November 1 last would be somewhat difficult because of some of the construction work, etc., going on at the same time having been interwoven with it. We learned, however, that the percentage of expense to gross revenue had reached as high as 78 per cent. It is our opinion, however, that ultimately the percentage of operating expense to gross revenue should reduce to 68 or 69 per cent.

The Atlanta, Birmingham & Atlantic runs in a northwesterly direction, across the states of Georgia and Alabama, and through parts of several counties that have heretofore been without railway facilities.

Fully 90 per cent. of the general traffic offering at present is directly or territorially competitive. Development of considerable traffic strictly local to the road has been retarded during the past by lack of transportation facilities. The principal commodities now being handled are cotton, lumber and naval stores (turpentine and resin).

Georgia ranks second as a cotton producing state, Texas first. Cotton offers for shipment in all territory reached by the road except in a stretch of mountainous country west of Talladega.

A matter for general congratulation is the fact that Manchester, Ga., a new place 78 miles out of Atlanta and the junction of the Atlanta division, now without any population to speak of, has been selected for the location of a large cotton mill to cost $500,000 and to be in operation for the cotton crop of 1909. This mill will employ at least 400 persons, for whom dwelling houses will be constructed at Manchester, and will immediately attract other lines of trade.

The Birmingham Coal & Iron Co., composed of interests friendly to the A. B. & A., owns over 40,000 acres of the best coal lands and over 3,000 acres of the best ore lands in the Birmingham district. It is estimated that the coal lands will yield 10,000 tons of coal per acre. This company also owns two blast furnaces near Birmingham capable of producing 10,000 tons of iron per month.

The coal mines, the iron mines and one of the furnaces are in operation, but not to the extent of their capacity. It is expected, however, that with the full resumption of commerce a very large tonnage will flow from these industries to the A. B. & A., to say nothing of the participation of the road in similar traffic from other like industries in the district.

The importance of Brunswick as a port and the necessity of maintaining the Brunswick Steamship Line as a connection of the A. B. & A. cannot be overestimated. The port of Brunswick is in competition with Charleston, Savannah and Jacksonville. This means that the Brunswick Steamship Line and the A. B. & A. are competing with the steamship lines to the ports just mentioned and their rail connections leading therefrom, and against long established and more frequent service, thus emphasizing the necessity of placing the Brunswick Steamship Line in position to freely compete with its neighbors, especially as upon efficiency of service depends the reputation and prosperity of any transportation company.

In a report addressed to the President of the Atlanta, Birmingham & Atlantic, H. A. Parker, formerly Vice-President and Chief Engineer of the Chicago, Rock Island & Pacific, in part says:

You have certainly built a good road and I believe strengthened your company by doing so. A finished road now certainly means less expense for maintenance in the future. Your company has also strengthened itself by securing large and convenient terminals at the three terminal points of Atlanta, Birmingham and Brunswick. It does not seem possible that your company will find it necessary, in this generation at least, to issue bonds as most old companies have done or are attempting to do, in order to secure funds for "betterments." These "betterments" generally consisting of the cutting down of grades; the elimination of curves; the replacing of temporary structures with permanent ones; sometimes double tracking; but more frequently the securing of additional terminals. Again it seems to me that your company is strong in the fact that it is in a position to control absolutely the movement of a large volume of traffic originating in the coal and iron fields of Birmingham; that it is so situated as to handle as cheaply and more expeditiously than your rivals, the cotton and other staples from probably the most fertile sections of Georgia and Alabama; and because with the completion of your line into Birmingham and its various connections at that place, there will be little temptation or occasion to build extensions and branches for self-protection.

While it seems probable that you will some day desire and in time will control a line to some port on the Gulf of Mexico, still, with its three terminals, Atlanta, Birmingham and Brunswick, and with steamship lines of adequate capacity from the latter place, the A. B. & A. will be in a position to sustain itself and rest from further construction if its owners so desire.

The completion of your road from Pelham to Mulga—about 29 miles—seems essential if the best results are to be secured; in other words, the reasons for undertaking the construction of the line in the first instance are still potent, and demand its completion at the earliest possible date, as by this line you secure entrance into your own coal fields. Next to the completion of your line to Mulga, the most important construction work in hand is the completion of the change of line of the old Eastern Alabama Railroad. This work is well advanced and the engineers in charge gave "early in January" as the probable time for completion, but considering the time of year and the nature of the work I would put this date near March 1, next.

It is my deliberate judgment that unless the present business depression has come to stay, which few expect, or the business of the country will dry up entirely, which no one believes, the A. B. & A. must soon come into its own, and furnish abundant reasons for its existence and justify the hopes of its builders.

Valuation of Railways in Minnesota.

The Railroad Commission of Minnesota has issued a pamphlet of 158 pages, giving the results of its appraisal of the railway properties in that state. The appraisal puts a considerably lower valuation upon the properties than that of the railway companies themselves. The railways claimed that the aggregate cost of reproduction of all the railways in the state on June 30, 1906, was $500,675,780; while the Commission's valuation, as of June 30, 1907, is much lower. The Commission practically made two valuations. In its estimate A, it made allowance for the claim of the railways that land used for right-of-way is more valuable than adjacent land used for other purposes, while in estimate B it inserted figures representing the values of the lands for other than railway purposes. In estimate A it fixed the cost of reproduction, new, of the physical properties at $411,735,195, and their present value at $360,480,160. In its estimate B it fixed the cost of reproduction, new, at $373,820,141, and the present value at $322,565,107. Omitting from estimate B allowance for adaptation and solidification of roadbed, amounting to $12,158,593, the Commission found the cost of reproduction, new, would be $360,961,548 and the present value $309,706,514.

The appraisements placed upon the different roads in estimate A are as follows:

Railway.	Miles of line in Minnesota.	Total cost reproduction.	Present value.
Chic., Burl. & Quincy	23.5	$2,726,670	$2,405,988
Chic. Great Western.....	117.6	7,769,914	6,714,147
Chic., Mil. & St. Paul....	1,202	54,591,393	47,459,752
Chic. & North Western..	651	21,214,978	17,463,934
Chic., Rock Island & Pac..	236	8,716,216	7,799,600
Chic., St. P., M. & O.....	431	26,778,560	22,838,120
D. & I. R.	241	20,564,552	17,771,796
D., M. & N.....	142	23,087,672	20,909,116
D. & N. E.	63.5	859,865	711,737
D. & M. N.	35	880,008	675,956
Great Northern	2,050	107,074,102	94,415,343
M., C. & F. D.....	27.3	772,072	622,941
M. & I.	174.5	3,966,309	3,409,461
M., St. P. & S. S. M.....	539.6	21,990,682	19,575,254
M. & St. Louis	378.5	16,622,245	14,276,189
Northern Pacific	967	69,397,955	61,099,563
Wisconsin Central	23.6	2,780,323	2,455,906
W., M. & P.	244	6,561,652	5,645,689
Illinois Central	30.2	944,302	800,845

Oklahoma Corporation Commission.

The state corporation commission of Oklahoma in its first annual report recommends that numerous sections of the law be made self-executing, giving the commission power for their enforcement. Among these provisions are those requiring public service corporations to maintain a public office in the state, where transfers of stock shall be made, etc., and shall not own or control the stock of any competitive corporation.

No vitality has been given, the report states, to the section making it mandatory, before license to do business in the state be granted to either foreign or domestic corporations, that lists of their stockholders, officers and directors must be filed with the commission. This information has proven of value to the state and the public, it shows, yet there is no means of enforcing the provision; also it suggests that, it be provided, that reports shall be made annually.

The commission wants authority to require a railway to pay for tracks extended to private industries, or such portion thereof as may be on the right-of-way of the railway company.

During the year ended Nov. 30 there were filed with the commission, 308 complaints, 52 of which are still pending. The

commission thinks that reductions in freight rates are saving the people between $1,000,000 and $2,000,000 annually.

The commission had intended to file suit before the Interstate Commerce Commission for reduction of interstate rates on hogs, grain, products and lumber, but a conference with the railway officials was held, and an agreement was reached for reductions which will amount to $500,000 annually as applied to Oklahoma. Henceforward the state corporation commission will require detailed reports by wire and mail from all railways and street railways relating to accidents.

Victorian Railways.

The following tables summarize the operating results of the Victorian Government Railways for the fiscal year ended June 30, 1908, and give comparisons of statistics for the last five years and the preceding five years. In 1908 the company operated 3,319 miles of line.

Financial Results, for Year Ended June 30th, 1908.

Gross revenue	$18,849,745
Operating expenses, including payment into railway accident and fire insurance fund	11,124,318
Net revenue	$7,725,427
Less deficit—St. Kilda and Brighton Electric St. Ry.	19,101
Total net revenue	$7,706,326
Special expenditures and charges completing liquidation of extraordinary liabilities taken over by the Commissioners on July 1, 1903.	229,008
Balance of total net revenue	$7,477,318
Interest charges and expenses.	7,220,946
Surplus credited to consolidated revenue	$256,372

	For five years—Last.	Preceding.	Change
Gross revenue	$90,974,521	$76,167,484 Inc.,	$14,807,037
Operating expenses	48,835,532	45,544,907 "	3,290,625
Net revenue	$42,138,989	$30,622,577 Inc.,	$11,516,412
Special expenditures & chrgs*	3,398,715	781,706 "	2,617,010
Balance of net revenue	$38,740,274	$29,840,872 Inc.,	$8,899,402
Interest charges and expenses.	36,095,984	35,688,837 "	407,147
Surplus to consolidatd revenue	$2,644,290	.....	.....
Deficit paid out of consolidated revenue	.....	5,847,965	.....
Train mileage	48,007,400	52,459,079 Dec.,	4,451,679
No. passengers carried	324,149,961	262,105,154 Inc.,	62,044,807
Tons of goods carried	16,942,845	14,445,830 "	2,497,015
Tons of live stock carried	1,521,265	1,241,705 "	279,560
Operating ratio	53.68	59.80 Dec.,	6.12

*In liquidation of extraordinary liabilities.

Joint Inspection of Cars at Kansas City.

A committee of transportation and mechanical officers that was appointed to investigate the desirability of establishing a joint car interchange and inspection bureau at Kansas City made its report on January 11 to the Kansas City Division of the Central Association of Railroad Officers. The committee recommended the establishment of such a bureau.

In making its investigation the committee used the figures for the month of September, 1908, as a basis. During that month 100,528 cars were delivered and received at Kansas City. The total number of interchange clerks employed was 51 and the aggregate salaries paid them was $3,339. The total number of inspectors employed was 60 and the aggregate salaries paid was $5,155. The total cost of supervision of inspection, including the salaries of the chief joint inspectors, was $1,205, making the total cost of interchange and inspection $9,699, for the month, or an average of 9.65 cents for transferring. The committee estimated that if there had been a joint bureau to handle both interchange and inspection 51 clerks and inspectors could have done all the work, whose salaries would have aggregated $4,234, and that the cost of supervision of both services would have been $1,815, making an estimated total cost of interchange and inspection of $6,049, or 6.02 cents a car. The total estimated saving under the proposed bureau plan would therefore have been $3,650, or 3.63 cents a car. The committee presented elaborate tables giving the figures upon which it based its estimates. It favored the establishment of a joint interchange and inspection bureau in charge of a competent chief reporting to and working in connection with the Central Association of Railroad Officers.

It based its recommendation not only on the greater economy of operation, which it was thought would be nearly $44,000 per year, but upon the belief that joint transfers would promote a freer movement of cars between connections; the furnishing of more prompt and accurate interchange reports for general and local offices, as it would eliminate almost entirely the correspondence now necessary to verify car records; and would permit prompt settlement of per diem accounts and make seal records, which would be obtained and kept by disinterested employees, more accurate.

The committee called especial attention to the carding of cars. The expense of this work on interchange tracks, which is being done by yard clerks, is not included in the figures in the report, and neither is the work provided for in the proposed plan, it being the committee's belief that this work can be best arranged for primarily by the representatives of the individual lines. After it has been arranged for, joint clerks to do the work might be placed under the supervision of the bureau.

It was decided to appoint a committee of five to work out in detail the plan for a joint bureau, and to report at the next meeting of the association. This committee is composed of G. E. Smith (C. B. & Q.), Chairman; E. J. Lampert (M. K. & T.); J. A. Somerville (M. P.); John Forster (St. L. & S. F.); and R. L. Stewart (C. R. I. & P.).

For the Committee on Standard Code.

A railway official has waxed sarcastic as the result of the restrictions imposed by municipal ordinances upon railway traffic in Ohio towns and proposes the following rules:

"When a train is approaching a team the engineer must stop the train and cover the engine with a tarpaulin painted to correspond with the scenery.

"In case a horse gets scared at an engine, notwithstanding the scenic tarpaulin, the engineer will take the engine apart as rapidly as possible and conceal the parts on the river bank.

"On approaching a curve where he cannot command a view of the track ahead, the engineer must stop the train, blow the whistle, ring the bell, fire a revolver, and send up three bombs at intervals of five minutes. * * *

"In case a train comes up behind a pedestrian he shall affect deafness until the engineer calls him a hard name.

"All members of the police force shall give up Sunday to chasing trains. * * *

"When a train approaches a crossing where the tracks are dusty, the engineer must slow down to one mile an hour and lay the dust with a hand sprinkler."—*Exchange.*

Washington Letter.

WASHINGTON, Jan. 27.—A complaint unique in the annals of railway rate litigation has been filed with the Interstate Commerce Commission by James Manahan, of St. Paul, Minn., representing the Minneapolis Threshing Machine Co., a complaint which, if successful, opens a new field for these litigants throughout the country.

The complaint sets up as one of its allegations that the stockholders of the Chicago, Minneapolis & Omaha and the Chicago & North Western railways are injured because of the excessive freight rates of these companies on farm machinery from Minneapolis and St. Paul to points in Wisconsin, Iowa and Nebraska. The complaint says the efficiency of these railways as common carriers is, to a degree, destroyed by the folly of their traffic managers in making a rate so excessive as to bar the movement of freight, handicap the business of shippers and the prosperity of both consumer and producer, "as does the arbitrary, exorbitant and unlawful rate enforced for the transportation of agricultural implements by these defendants." The complaint states that "extortion" amounts to $100,000 annually, and leaves it to the imagination to estimate the amount the stockholders are injured.

This is the first time in the history of cases of this character that the interest of the stockholder of the railway has been set up by the complainant as a plea in favor of lowering a freight rate. But the threshing machine company claims it has to pay annually over $500,000 in freight rates that are so excessive as to materially interfere with the volume of business it would do

were the rates charged reasonable. This, it is alleged, must all come out of the farmer, and the natural result is that the latter individual often declines to buy machinery at all, and at all times exercises every possible makeshift to put off as long as possible the evil day when he will have to procure a new machine.

The complaint is specific in its allegations of over-charges as to the points in Wisconsin, Iowa and Nebraska. And it asserts that the North Western transports the same line of commodities like distances out of Chicago for a much lower rate. The charge is directly made that this commodity has to bear more than its share of the carrier charges and the reasonableness of the western classification is vigorously attacked.

Pursuing its assualt the complaint urges a special point against the Omaha road for increasing the rate from Hopkins, where the manufacturer's plant is located, $5 per car, the increase having been put into force January 10. In this connection the complaint alleges that the whole North Western system could be reproduced in its present condition for not more than $30,000 per mile, and yet that it earns net over legitimate operating expenses not less than $8,000 per mile annually, proving that it does not need this increase, which in many instances amounts to 30 per cent. G. G.

Railway Business Association.

On January 21, the Board of Directors of the Retail Merchants Association of Richmond, Va., adopted the following resolution:

"The railways and the industries directly and indirectly dependent upon them form a very large part of the commercial life of the city of Richmond, of the state, and of the entire country, the welfare of approximately thirteen million persons being greatly dependent upon the prosperity of these industries.

"We therefore favor and urge upon our legislators, state and national, the adoption of a policy which will tend to restore prosperity to these industries.

"The railway problem, overshadowing all others in Virginia and in the South, in our opinion, is how to furnish adequate service and conveniences and give additional transportation facilities. To this end revenues must be adequate and should not be diminished.

"We respectfully request the State Corporation Commission to withdraw the passenger rates recently promulgated.

"Resolved, That the foregoing be published, and a copy sent to the members of the State Corporation Commission, to all of our state officials and to each member of the Legislature of Virginia."

Resolutions bearing on this same subject were passed, up to January 25, by the following commercial bodies:

Illinois Manufacturers' Association.
Southern Commercial Congress.
Board of Trade and Transportation, City of New York.
Merchants' Association of New York.
Detroit, Mich., Board of Commerce.
Jacksonville, Fla., Board of Trade
Clarksburg, W. Va., Board of Trade.
Indianapolis, Ind., Board of Trade.
Dayton, Ohio, Chamber of Commerce.
New Orleans, La., Progressive Union.
National Boot and Shoe Manufacturers' Association.
Board of Trade, Chicago, Ill.
Merchants Association of York, Pa.
Bristol, Va.-Tenn., Board of Trade.
National Shoe Wholesalers Association of the United States.
American Hardware Manufacturers' Association.
Pittsburgh, Pa., Chamber of Commerce.
The Manufacturers' and Merchants' Association of Kansas City.
Philadelphia, Pa., Board of Trade.
San Antonio, Tex., Business Men's League.
Retail Merchants' Association, Richmond, Va.
Columbus, Ohio, Board of Trade.
Business Men's Association of Auburn, N. Y.
Battle Creek, Mich., Industrial Association.

Care of Gutters.

It is a very common thing to pass a railway building in otherwise good repair whose gutters leak. The cornice is bare and often rusty, and there is never a thought of the results or of a remedy. When a building is finished, when the cornice work is galvanized, no one thinks of rust. No one will ever see the inside of gutters and the money can be spent where it will make a better showing. In addition, they are never looked after or painted, even the cinders are not cleaned out of them until they are choked and run over, and when rust starts there is very little hope of saving them.

Railway buildings are not difficult to find that have been in use ten years, and those in charge cannot be induced to put a coat of paint on the metal work simply because the remainder of the building does not seem to need repairs. Very often double gutters of heavy material are allowed to rust through, and when this is done the only remedy is renewal, and with such gutters under a slate roof the expense is out of all proportion to the cost of cleaning out the cinders and putting on a coat of paint every year or two. No one seems to be willing to take the responsibility of keeping gutters from rusting out, but it would seem that if their care was turned over to the painter who would look after them, see that the cinders are kept out, and that they are properly painted during the dry weather, it would be the means of saving the cost of replacing two or three layers of slate and the expense of renewing, not to mention the inconvenience of leaking gutters and ventilators.—*From a paper by H. J. Barkley, Secretary, Maintenance-of-Way Master Painters' Association.*

A Suggestive Old Railway Contract.

The new and perpetual contract between the New York Central and the New York, New Haven & Hartford Railroad companies lately signed refers back in a number of places to the original contract of 1848, 60 years ago, of the New Haven and Harlem railroad companies. The original is in the archives of the contracting companies. It relates entirely to rates to be charged the New Haven by the Harlem for entry to New York over its tracks, and in its sixth paragraph indicates what a time of small things it was where there was to be in years after a great railway terminal. The paragraph reads as follows:

Sixth.—It is mutually understood and agreed that the New York & New Haven Railroad Company shall pay, in the manner hereinafter provided, and the New York & Harlem Railroad Company shall receive as full compensation, for the use and occupation of their track or tracks as aforesaid, a certain sum for each passenger transported by the said New York & New Haven Railroad Company in their several trains, to be dependent upon and adjusted by the total number so transported daily, according to the following scale: For any number not exceeding 1,000 per diem at the rate of 14 cents each; for any number not exceeding 1,250, but over 1,000, per diem, at the rate of 12 cents each; for any number not exceeding 1,500, but over 1,250, per diem, at the rate of 10 cents each; for any number not exceeding 1,750, but over 1,500, per diem, at the rate of 9 cents each; for any number not exceeding 2,000, but over 1,750, per diem, at the rate of 8½ cents each; for any number not exceeding 2,500, but over 2,000, per diem, at the rate of 8 cents each; for any number not exceeding 3,000, but over 2,500, per diem, at the rate of 7½ cents each; for any number not exceeding 3,500, but over 3,000, per diem, at the rate of 7 cents each; for any number not exceeding 4,000, but over 3,500, per diem, at the rate of 6½ cents each; for any number exceeding 4,000 per diem, without further limit, at the rate of 6 cents each.

At the present time, in contrast with those days, the New Haven Company carries in and out of New York City some 9,000,000 passengers a year, or nearly 25,000 a day entering or leaving the Grand Central station alone.

The old contract, bearing date of March 17, 1848, is signed by Charles Parshall, President of the New York & Harlem Railroad Co., and Robert Schuyler, President of the New York & New Haven Railroad Co., Schuyler being the man who, by a latter issue of spurious New Haven stock to the amount of $1,954,000—the genuine stock being $3,000,000—crippled his company for many years. The Harlem service supplied to the New Haven was between Williams Bridge and the old Canal street station of the Harlem Company, and the contract was, in a sense, forced from the New Haven corporation after its unsuccessful appeal to the New York legislature to secure charter rights to enter New York City. In resisting that attempt the Harlem Railroad Company was joined with the Westchester Turnpike Company. Had the New Haven succeeded it would probably to-day be owning the large terminal in the heart of New York City.

Panama Canal Cost.

The cost of the Panama Canal construction from May 4, 1904, to October 1, 1908, is as follows:

Department of Civil Administration	$2,381,000
Department of Sanitation	7,408,000
Department of Construction and Engineering	51,512,000
Bldgs. for Dep. of Const. & Eng., incl. quarters	8,550,000
Buildings for Department of Civil Administration	336,000
Buildings for Department of Sanitation	1,228,000
Buildings for military protection	64,000
Construction of electric light plants	206,000
Purchase of steamers Panama and Colon	1,300,000
Double-tracking Panama Railroad	1,056,000
Relocation of Panama Railroad	1,857,000
Docks and wharves leased to Panama R. R. Co.	514,000
Municipal improvements	2,281,000
Municipal impvmts. for benefit of Canal Zone settlemts.	3,701,000
Lands purchased and expropriated	97,000
Buildings, tools, Cristobal shops	174,000
Locomotives, cars, and equipment	610,000
Total	$83,275,000
French franchise	40,000,000
Paid Colombia	10,000,000
Grand total to October 1	$133,275,000

MEETINGS AND APPOINTMENTS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.; May 11-14, 1909; Richmond, Va.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.; May 11; St. Louis, Mo.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.—R. W. Pope, 33 West 39th St., New York; second Friday in month; New York.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Pl., New York; May 19, 1909; New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—S. F. Patterson, B. & M., Concord, N. H.; Oct. 19, 1909; Jacksonville, Fla.

AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASSOC.—E. H. Fritch, Monadnock Bldg., Chicago; March 16-18, 1909; Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago; June 16-18, 1909; Atlantic City.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed., except July and Aug.; New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN STREET AND INTERURBAN RAILWAY ASSOCIATION.—B. V. Swenson, 29 W. 39th St., New York.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; April 28, 1909; Cincinnati.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A., T. & S. F., Topeka, Kan.; May, 1909; Detroit, Mich.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Wisconsin Central Ry., Chicago; June 23-25, 1909; Detroit.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Pl., New York; June 22-23; Montreal.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; irregular, usually weekly; Montreal.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R.R., Richmond, Va.; June 16, 1909; Old Point Comfort, Va.

INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 62 Liberty St., New York; May, 1909; Louisville, Ky.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago; June, 1909.

IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago; June 21-23, 1909; Atlantic City.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in mnth, ex. June, July, Aug. and Sept.; Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.

NORTH-WEST RAILWAY CLUB.—T. W. Flannagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, Aug.; St. Paul and Minn.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburg, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.; March 15, 1909; Chicago.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio; May 17-19; Chicago.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; Nov., 1909; Washington.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. H. O'Donnell, Bogalusa, La.; April 15; Atlanta, Ga.

SOUTHERN AND SOUTHWESTERN RY. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., April, Aug. and Nov.; Atlanta.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R. R.R., East Buffalo, N. Y.; September, 1909; Denver.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony Bldg., Chicago; 3d Tuesday each month, except June, July and August; Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago; 1st Wednesday, except July and August; Chicago.

Association of American Industrial Commissioners.

A meeting of railway industrial agents was held at Birmingham, Ala., January 22, and about 50 of the leading railways of the United States were represented. Col. T. G. Bush, of Birmingham, was one of the chief speakers. Those in attendance included President J. C. Claire (Illinois Central), W. Gallagher (Western Maryland), Col. F. Y. Anderson (Alabama Great Southern), J. M. Mallory (Central of Georgia), Guy L. Stewart (Cotton Belt), C. J. Huff (Michigan Central), C. A. Park and S. B. Scott (Louisville & Nashville), E. V. Shoemaker (Delaware & Hudson), Luis Jackson (Erie), L. L. Lawrence (Mobile, Jackson & Kansas City).

Traffic News.

At Baton Rouge, on January 27, the Louisiana State Railroad Commission gave a hearing on a proposition to reduce rates on cotton seed for planting. As the cotton planting season is near at hand it is the purpose to make the proposed rates effective for February 1.

Important changes will be made soon in the passenger train service of the Burlington between Kansas City and Chicago and the Pacific coast. Solid through limited passenger trains will be put on from Chicago to Seattle, via St. Paul, and from Kansas City to Seattle, via Billings.

The Carolina, Clinchfield & Ohio has made its connection with the Seaboard Air Line at Bostic, N. C., and the first delivery of coal to the Seaboard has been made. The Carolina, Clinchfield & Ohio has agreed to deliver to the Seaboard Air Line Railway 1,000,000 tons of coal annually.

On the western lines of the Canadian Pacific there is now an Industrial Department. This department has been established for the purpose of providing a convenient means of intercourse between manufacturers and merchants who wish to embrace opportunities for business in western Canada and the boards of trade and property owners in that region who are interested in encouraging the establishment of new business enterprises.

The Union Pacific, to meet the complaint of the Nebraska State Railway Commission that local passengers are not given as good facilities as through, has put a buffet car on one of its local trains leaving Omaha in the morning so that passengers who desire meals can have them. Chair cars have been put on some of the fast through trains so that local passengers may have a suitable place to ride. The Overland Limited will not carry local passengers in Nebraska.

On account of the decision of the interstate commission on the two-cent refund allowed by New York lines to refineries on shipments of sugar, and because of the refusal of the commission to say whether or not the commission would prosecute if the practice were continued while the matter is being contested in the courts, the New Orleans tariff committee has decided to indefinitely postpone its proposed new sugar tariff. This action was taken after two days' discussion.

The Wisconsin Central began running trains over its new line into Superior, Wis., on January 4. The new line extends northward from Owen, Wis., and stations on it, with their mileage from Chicago, are as follows: Owen, Wis., 318 miles; Lublin, 330 miles; Gilman, 337 miles; Sheldon, 349 miles; Ladysmith, 362 miles; Murry, 373 miles; Weirgor, 380 miles; Stone Lake, 398 miles; Stanbery, 412 miles; Chittamo, 421 miles; Gordon, 430 miles; Solon Springs, 438 miles; Hillcrest, 450 miles; Way, 455 miles; Superior, 471 miles.

A short time ago the citizens of Lemont and Lockport, Ill., asked the Chicago & Alton for an additional train between these points and Chicago. There was a through train from Kansas City which came through these places at 7:30 a.m., but the people wanted a train that would leave at about 8:15, and always be on time. The officers of the road said that the train would not pay, but the citizens insisted that it would, and the Alton suggested that if they were sure they should guarantee its expenses. The city councils of Lemont and Lockport then met and voted to guarantee the expenses. The Alton finding them so confident announced that it would not insist upon the guarantee, but would put the train on for three months and would start it from Joliet so that it would get the benefit of the travel from that point. If at the end of three months it is found the train pays, it will be kept on.

If not, the citizens will be asked, in case they insist upon having it kept on, to pay any deficit that there may be in its earnings.

The competition of rival steamship companies for traffic between New York city and Gulf ports has become so sharp that railways to those points are becoming involved. The Texas City Steamship Company put vessels in service between New York and Galveston and Houston about five months ago, and made sweeping reductions in rates. The Morgan and Mallory lines responded by announcing still lower rates. The resulting situation amounts to a rate war for all traffic moving between New York and Gulf ports. Traffic to interior Texas points has become affected as these points can ship by boat to Galveston and thence by rail much cheaper than they can ship all-rail from New York. As no reductions have been made in rates from New York to New Orleans the jobbers in New Orleans are complaining of the rates to Galveston.

The lines in the Western Passenger Association have failed entirely to reach an understanding as to whether to maintain a flat 2-cent fare this year, and, if not, as to what special rates shall be made. The result is that some extremely low rates have been announced and it is an open secret that there are bitter feelings and harsh recriminations. One reduction announced is a rate of 1 cent a mile by the Union Pacific between Kansas City and Omaha. It has been decided, much against the wishes of some lines, to make a rate of one fare for the round trip between Chicago and Missouri river territory for the G. A. R. encampment at Seattle in August. The rate for the convention of the Young People's Society of Christian Endeavor at St. Paul will be a fare and a half, and for the convention of the National Educational Association at Denver the rate will be the regular summer tourist rate, $30 for the round trip from Chicago. These facts are sufficient to show that the entire plan for maintaining rates in W. P. A. territory on a 2-cent basis has gone by the board. The fundamental cause of the failure to reach any agreement was the desire of various roads to attract colonists to their respective territories by means of special rates. At the meeting of the W. P. A. in Chicago on January 22 the committee appointed to consider the entire question of reduced rates for gatherings made majority and minority reports. The majority opposed any further reductions. The minority favored one and one-half fare for gatherings of 1,000 persons or more. Neither report was adopted.

INTERSTATE COMMERCE COMMISSION.

Rates established by state authority are presumed to be reasonable, but the same presumption also attaches to rates voluntarily established by carriers, and in proceedings before this Commission no greater sanctity can be presumed in respect of rates established by a state railway commission than of those voluntarily established by carriers.

Prompt Delivery Not Enforceable by Commission.

J. C. Blume & Co. v. Wells Fargo & Co. Opinion by Commissioner Harlan.

Because of the failure of the defendant to make prompt delivery of a carload of fruit at the unloading station designated by the shippers, the latter were unable to take advantage of a high market and were compelled later to sell at lower prices. For the loss thus sustained they demand reparation. Complaints for damages of this character are not cognizable by the Commission. The prompt and safe carriage of goods is an obligation enforced on carriers by the common law and not by the act to regulate commerce. Damages may be awarded by the Commission only for a violation of some provision of the act.

Agreement in Making a Joint Rate..

Grand Rapids Plaster Co. v. Pere Marquette et al. Opinion by Commissioner Cockrell.

Complainant shipped two carloads of plaster from Grand Rapids, Mich., via Milwaukee, Wis., to Houghton, Mich., for which it was charged a rate of 20 cents per 100 lbs. When the shipments were made the initial carrier had a published rate on plaster between said points of 16½ cents per 100 lbs., but at the date of shipments the delivering carrier had not concurred in the 16½-cent rate. Subsequently the 16½-cent rate was made the legal rate over the route taken. The 20-cent rate was unjust and unreasonable, and the 16½-cent rate is a just and reasonable rate for the future. Reparation awarded.

Rates from the East to Green Bay.

Green Bay Business Men's Association v. Baltimore & Ohio et al. Opinion by Commissioner Prouty.

Rates from eastern territory to Green Bay, Wis., may properly be higher than the Chicago scale. The basis now in effect, which is about 107 per cent. of Chicago, is not found unlawful. The Commission has often held that the long maintenance of a given rate is an admission of the reasonableness of that rate. It has also held that where, on the strength of a given rate, capital has been invested and industrial conditions have become established, this rate cannot be discontinued without taking into account its effect on these commercial and industrial conditions. But it has never been said that there was any absolute rule requiring for any reason the indefinite continuance of such a rate. It is always a question of what, under all the circumstances, is just and reasonable.

No Authority Over Claims of Railway Against Shipper.

Laning-Harris Coal & Grain Co. v. St. Louis & San Francisco. Opinion by Chairman Knapp.

Between November 8, 1906, and April 20, 1907, defendant through error collected from complainant as switching charges on interstate carload shipments of hay to Kansas City, Mo., $42 in excess of the amount authorized by its tariff, and refused to refund the same because previously it had, through error, collected an amount less than that required by its tariffs, which it has since been unable to collect from complainant. It now pleads set-off of the amount alleged to be due it from complainant.

Inasmuch as the Commission is without authority to adjudicate the claim of a railway company against a shipper, it cannot consider the counter-claim of defendant, but it has authority to award damages in a case where a carrier collects a greater sum on an interstate shipment than is fixed by its published tariffs and therefore reparation of $42 is awarded.

Discrimination by the Use of Unfair Joint Rates.

Cedar Hill Coal & Coke Co. et al. v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Prouty.

A purchaser of coal from the Victor Fuel Co. at its mines on the Colorado & Southeastern for points of consumption on the Santa Fe has the benefit of the Trinidad rate, while coal from mines of complainants near Ludlow, in the same district, for the same destinations, must pay 40 cents above the Trinidad rate. The Colorado Fuel & Iron Co. ships coal from its mines on the Colorado & Wyoming to points on the Santa Fe at the Trinidad rate. The Victor Fuel Co. owns the Colorado & Southeastern, and the Colorado Fuel & Iron Co. owns the Colorado & Wyoming. Complainants, who are engaged in mining coal in the Trinidad district, in Colorado, near Ludlow, on the Colorado & Southern, claim that defendants unduly discriminate against them in favor of the other coal companies mentioned. The arrangements entered into between these railways work an undue prejudice against the mines of complainants and give unlawful preference to their competitors.

Railways should not be allowed to so divide and diversify themselves by contract and traffic agreements as to work a practical discrimination. So long as there is identity of ownership in the agency of transportation and the thing transported it is extremely difficult, if not impossible, to prevent discrimination between shippers.

The present rate of 40 cents per ton from the mines of complainants to Trinidad, when the coal is for points on the

Santa Fe, is excessive, and should not for the future exceed 25 cents. The Santa Fe should, by proper tariff provision, apply to this coal when received from the Colorado & Southern at Trinidad a rate of 10 cents per ton less tnan the local Trinidad rate.

Express Companies as Bankers and as Carriers.

American Bankers' Association v. American Express Co. Opinion by Commissioner Clark.

Complainants alleged that defendant express companies, by dealing in domestic and foreign exchange, money orders, letters of credit, travelers' checks and drafts, and foreign money, trespass upon the business of bankers, and by the unfair use of their business as common carriers violate the act to regulate commerce by unjust discrimination against complainants. Defendants claim that they are subject to the act to regulate commerce only as forwarders of goods by express and not in respect to any other kind of business, and that their financial business has no relation to their business as common carriers and does not constitute interstate or foreign commerce. On defendants' motion to dismiss complaint and complainants' request for subpoena. As there may be some question of unjust discrimination involved in the matter, the motion to dismiss the complaint is denied; but as the information sought by complainants through the issuance of subpoena does not seem to be necessary and the request is denied.

There can be no doubt as to the jurisdiction of the Commission of any question of discrimination connected with the service of the express companies as carriers; but even if unjust and undue discrimination, free from criminal act, were shown to exist in their practices, it is clearly the duty of this Commission to go no further in destruction or disturbance of the business of the carrier, or in depriving the public of conveniences and facilities of value to it, than is necessary in order to remove the discrimination to the extent that it is unjust or undue.

The extent, if any, to which defendants transport money for themselves for the purpose of settling balances in the carrying on of their financial operations has not been shown. The relationship of the cost of this service and of the charges made therefor has not been presented. There may or may not be some question of unjust discrimination involved therein, and complainants should be given an opportunity to present their proofs in support of this alleged discrimination and the defendants should have an opportunity to answer. The Commission shall therefore fix a time for hearing of further testimony along the lines herein indicated.

Coming into Court With Unclean Hands.

C. C. Folmer & Co. v. Great Northern et al. Opinion by Chairman Knapp.

Without tariff provision therefor, prior to August 28, 1906, the Wisconsin Central had an arrangement whereby it would hold at Menasha, Wis., shipments of shingles consigned to complainant and which originated on the Pacific coast, subject to rebilling and forwarding to points of destination beyond Chicago. Under this arrangement shipments would move to Chicago on the proportional rate applying between Minnesota Transfer and Chicago the same as if they had not been stopped at Menasha. In connection with a carload shipment delivered March 2, 1906, to the Great Northern at Bellingham, Wash., that company's agent failed to note on billing the bill of lading instructions for delivery to the Wisconsin Central at Minnesota Transfer, and shipment was at that point turned over to the Chicago, Milwaukee & St. Paul, whence it was rebilled to Detroit, Mich., resulting in the application of a 10-cent rate, Minnesota Transfer to Menasha, plus an 8½-cent rate, Menasha to Chicago, instead of the 10-cent proportional rate, Minnesota Transfer to Chicago, which would have been applied under complainant's arrangement with the Wisconsin Central had the car been delivered to that road at Minnesota Transfer. The negligence of the Great Northern caused complainant to pay $28.50 more than it preumably would have paid, but not more than it was lawfully bound to pay under the tariff then in force. The rate exacted was the only rate lawfully applicable, under the tariffs on file with the Commission, via either route.

The holding, storing, unloading and reloading of Pacific coast shipments of shingles at Menasha subject to rebilling and reconsignment under the proportional rate from Minnesota Transfer to Chicago was a privilege and service that required publication in a tariff in order to be lawful. An act of negligence which deprives the shipper of the enjoyment of an unlawful rate cannot be made the basis of a claim for reparation.

Meeting a Competitive Rate Not Compulsory.

L. B. Menefee Lumber Co. v. Texas & Pacific et al. Opinion by Commissioner Clark.

Defendants' rate of 32.5 cents per 100 lbs. for the transportation of yellow pine lumber from Lake Charles, La., to El Paso, Tex., 1,067 miles over two lines, cannot be found unreasonable because a single line has a published rate on such commodity between the same points of 25 cents per 100 lbs., carrying it 972 miles, even though defendants subsequently for competitive reasons reduced their rate to 25 cents per 100 lbs. Whatever may have been the practice in the past of "meeting the rate," the act to regulate commerce and the decisions of the Commission interpreting its provisions, unmistakably lay down the doctrine that tariffs must now be adhered to.

The Commission cannot sanction the idea that a lower rate in effect via one line than via another line is conclusive evidence of the unreasonableness of the higher rate. If reparation were granted in this case it would go far to support the theory that a carrier may not voluntarily reduce its rate without being liable for damages on all past shipments, a theory which cannot be accepted by the Commission.

STATE COMMISSIONS.

The Pennsylvania State Railroad Commission has recommended that the Pittsburgh, Westmoreland & Somerset, operating about 25 miles of line, reduce its passenger fares to 3 cents a mile for through passenger and 3½ cents a mile for local passengers. This is in accordance with the Pennsylvania Railroad law of 1849. The defendant claimed that its passenger business was not a source of profit, it being a lumber road.

The Railroad Commission of Wisconsin by denying the petition of Alderman C. F. Lang, of La Crosse, held that it cannot either authorize the construction or extension of any electric railway "within the city or prevent the abandonment or exchange of location of any such road constructed under a franchise granted by the common council if the council's consent thereto has been obtained." The commission decides it has no veto power over the act of a common council in consenting to the abandonment of a part of a street railway or its re-location within the corporate limits.

COURT NEWS.

The Supreme Court of the United States has denied the petition of the Chicago & Alton for a rehearing of the case in the conviction of the road and its Vice-President and General Freight Agent for refunding $1 a car on packing house shipments for use of the private tracks of the packer was affirmed.

The Railroad Commission of Texas has directed the Attorney-General to bring suit against the Missouri, Kansas & Texas for 24 alleged violations of the Commission's order that railways shall operate their trains in accordance with advertised schedules, no train's departure to be delayed more than 30 minutes past the schedule time.

The Federal government has filed at Portland, Oregon, 35 suits against the Oregon & California Railroad Company, the Southern Pacific Company, the present owners of the Oregon & California Railroad and more than 100 other individuals and private corporations, to recover from the railways and their grantees, who comprise the other defendants, an aggre-

gate of 353,288 acres of land, within the Oregon and California land grant in Oregon. The lands are valued at over $15,000,000. Among the defendants are Willis H. Gilbert, West Coast Timber Co. and Peninsular Lumber Co., Pillsbury Lumber Co., Central Trust Co., Chicago, and the Detroit Trust Co., Detroit, Mich.

Judge Hazen, Master in the suit by the Leavenworth & Topeka, to have freight rates fixed by the Kansas Railroad Commission annulled on the ground of unconstitutionality, has filed a report with the federal court at Topeka, Kan., holding that the road is entitled to a permanent injunction restraining the Commission from enforcing its order.

The Supreme Court of Virginia has denied the right of appeal to the state court in the two-cent rate case and the railways will either have to go into the United States Circuit Court of Appeals and have the case heard at length, or they can go to the corporation commission and make application for a revision of the rates on the ground that they are confiscatory.

The prosecuting attorney of Holmes county, Ohio, has begun a suit in the courts to dissolve, as unlawful, the agreement and regulations on which are based the relief associations of the Baltimore & Ohio Railroad and the Pennsylvania Lines. The petition asks that $4,000,000 held by the companies be paid back to the employees who have contributed it. This action is brought under a law passed in April, 1908, forbidding railways to enforce any arrangement or agreement which requires employees to waive rights to damages for personal injuries or death.

Railway Need Not Build Side Track to Factory.

The Supreme court of Oklahoma, reversing the action of the State Corporation Commission, decides, in the case of the Chicago, Rock Island & Pacific, that the road need not build a side track to the mills of certain grain companies. The court holds that a common carrier, though required to provide equal facilities, is not required to furnish facilities to overcome disadvantages caused by dissimilarity of location. The general public is not demanding this side track, nor is it clear that it would accommodate any considerable number of people except the complainants.

Argument in Missouri Rate Case.

Final arguments in the cases of the 18 railways that are contesting the constitutionality of the Missouri 2-cent fare and maximum freight rate acts, began before Judge Smith McPherson in federal court at Kansas City, Mo., on January 20. Frank Hagerman, who is counsel for all of the railways in these cases, said that under the 2-cent fare,—assuming that the cost of handling intrastate business was no larger than the cost of handling interstate business,—the Rock Island, the St. Louis & Hannibal, the Kansas City, Clinton & Springfield, and the Chicago Great Western showed an actual loss on intrastate business, and that the returns for other roads had been as follows: Frisco, 4 per cent.; Santa Fe, 5 per cent.; Kansas City Southern 2½ per cent.; Missouri, Kansas & Texas, 3 per cent.; Burlington, 4 per cent.

Sanford B. Ladd, in his argument for the state, contended that the Burlington, whose officers claimed it had lost $630,000 on intrastate freight business in 1904, actually made a profit on that business of $850,000. Herbert S. Hadley, Governor and Former Attorney-General of Missouri, who made the principal argument for the state, contended that if the railways would stop issuing free passes and otherwise discriminating between passengers, their passenger business could be made profitable on a 2-cent basis.

The argument for the railways was closed by Gardiner Lathrop (Atchison) who laid stress on the fact that recent reductions in rates by the states had compelled reductions in interstate rates, owing to competitive considerations, and said that if no restraint were placed upon the states they could practically work a repeal of the interstate commerce clause of the federal constitution. Mr. Lathrop also attacked the 2-cent fare law because it permits roads 45 miles long or less to charge higher rates than longer roads. This is class legislation.

State Control Over Interstate Traffic.

The Supreme Court of the United States on Monday last reversed the decision of the Kentucky Court of Appeals requiring the Louisville & Nashville to deliver to the Southern Railway live stock shipped over the L. & N. in its own cars and consigned to the Central Stockyards. These stockyards are on the Southern road, nine miles out of Louisville, and it was charged that in an effort to discriminate in favor of the Bourbon Stockyards the Louisville & Nashville had refused to make the transfer to the Southern notwithstanding the lines connect at more than one place in and around Louisville. The opinion was announced by Justice Holmes and was based on the ground that the transfer requirement was an interference with interstate commerce. The case affects the Constitution of Kentucky as it was under a provision in that instrument and not under a state law, that the attempt was made to compel transfer.

Justices Harlan, McKenna and Moody dissented, contending that the order of the state court should be upheld certainly as far as the intrastate traffic was concerned, and that the police power of the state was wide enough to cover all the traffic. Differing with the majority as to the failure to provide compensation and security for L. & N. cars delivered to the other road, Justice McKenna averred that the Kentucky provision certainly recognized that principle sufficiently, and he feared the departure from the previous decisions of the court in this regard would seriously affect important provisions of the interstate commerce act.

The majority decision, among other things, said:

"We are far from saying that a valid law could not be passed to prevent the cost and loss of time entailed by needless transshipment in case of an unreasonable refusal of a carrier to interchange cars with another . . . but such a law ought to be so limited as to respect the paramount needs of the carrier concerned and at least could not be sustained only with full and adequate regulations for his protection from the loss of undue detention of cars and for securing due compensation for their use. But the Constitution of Kentucky makes a universal undiscriminating requirement, with no adequate provision for these rights, and cannot be cured by inserting them in judgments under it. The law itself must save the parties' rights and not leave them to the discretion of courts as such. . . . The duties of the carrier to accept goods tendered at its station do not include the duty to accept cars offered it at any point near its terminal by a competing road for the purpose of reaching and using its terminal station."

Commissioner Colquitt on Rate Regulation.

Railroad Commissioner O. B. Colquitt, of Texas, in an address before the Retail Hardware and Implement Dealers' Association at Dallas on January 20, charged that to prevent reduction of rates the railways use shippers against each other. When the cotton shippers wanted a reduction in rates, railway officers got jobbers to ask the Commission to refuse to grant it for fear that the jobbers' interstate rates would be advanced. Then, he said, when the jobbers asked for a reduction in rates, the railways got the cotton shippers to oppose it upon the ground that an advance in rates on cotton would result.

Mr. Colquitt declared that the rate question had proved too big a problem for the Interstate Commerce Commission and asserted that rates in Texas are higher than anywhere west of the Mississippi or east of the Rocky mountains. If the State Commission reduced rates the railways raised the interstate rates. He said that he favored reducing rates in Texas in retaliation for the recent advances in interstate class rates, but that his colleagues voted him down. As a means of controlling rates Texas, he said, should control, if not own, a line of railway from the Red river to the Gulf. Texas ought, he said, to be a stockholder in every railway built in the state; that would let the state into the secrets of the railways. The railways have got control of the steamship lines. Texas should restore water competition by owning steamships. "The people will have to take hold of the interstate rate question themselves, for the Interstate Commerce Commission is going to fix as high a rate eventually as the Republican protective tariff; and on account of the different combinations of rates over the different lines, it is impossible for that Commission to afford the people relief."

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF NOVEMBER, 1908.
(See also issues of January 8, 15 and 22.)

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenues (or deficit).	Outside operations.	Taxes.	Operating income (or loss).	Increase (or dec.) comp. with 1907.
					Maintenance										
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.					
Charleston & Western Carolina	340	$88,732	$23,821	$119,422	$26,191	$14,019	$2,518	$50,698	$3,130	$96,556	$22,866	.....	$4,100	$18,766	‡$26,703
Chicago, Cincinnati & Louisville	285	86,097	20,283	112,426	29,797	25,778	8,347	51,983	5,440	121,345	8,919*	.....	3,250	12,169†	269
Chicago, Indiana & Southern	329	219,058	17,728	245,518	24,100	48,181	6,456	92,891	4,810	176,438	69,080	$3,500	15,000	57,580	‡2,460
Chicago, Peoria & St. Louis	255	99,843	24,333	130,963	19,579	27,935	6,334	58,080	5,685	117,613	13,350	.....	4,600	8,750	‡2,320
Chicago, Rock Island & Gulf	493	215,905	63,120	292,274	84,075	18,831	5,622	103,820	8,842	221,190	71,084	171*	682	70,231	†9,803
Cleveland, Akron & Columbus	210	122,312	33,227	168,423	15,309	28,257	2,361	58,564	2,728	107,219	61,204	.....	7,077	54,127	5,075
Cleveland, Lorain & Wheeling	194	323,625	16,396	358,337	31,655	55,239	5,914	112,479	5,484	210,771	147,566	.....	9,406	138,160	‡30,777
Colorado Midland	338	166,194	27,685	225,752	20,555	28,719	9,773	87,189	5,916	152,152	73,600	376*	8,400	64,824	20,637
Cumberland Valley	162	155,145	44,974	210,987	16,481	17,110	3,387	61,738	4,336	103,052	107,935	482	3,713	104,704	10,011
Detroit & Mackinac	348	55,909	24,308	85,480	10,509	12,373	1,699	29,238	2,537	56,356	29,124	469*	6,932	21,723	‡7,517
Duluth & Iron Range	168	569,450	21,498	596,492	98,230	45,010	463	119,809	8,054	271,566	324,926	2,418	23,760	303,584	‡108,166
Elgin, Joliet & Eastern	239	198,815	79	205,086	24,269	33,218	2,500	66,015	6,627	132,629	72,457	.....	9,500	62,957	‡18,101
Evansville & Terre Haute	310	109,465	44,532	173,972	26,926	26,764	3,745	55,723	6,906	120,064	53,908	312*	9,035	44,561	‡18,925
Fort Worth & Denver City	454	319,148	136,248	473,490	66,460	75,294	6,669	132,138	14,551	295,112	178,378	387	8,800	169,965	26
Fort Worth & Rio Grande	196	109,673	34,060	149,388	11,744	12,536	3,242	37,852	6,135	71,509	77,879	.....	590	77,289	80,842
Georgia	307	170,635	59,361	245,060	47,437	27,924	9,056	104,485	6,686	195,588	49,472	.....	1,625	47,847	‡502
Gulf & Ship Island	307	124,454	31,930	168,013	33,443	25,450	1,395	52,251	7,416	119,955	48,058	.....	3,685	44,373	5,330
Houston, East & West Texas	191	78,474	25,782	110,532	18,669	9,184	807	32,412	3,031	64,103	46,430	.....	2,388	44,042	15,077
Kanawha & Michigan	177	166,950	25,609	197,172	39,238	48,088	2,815	62,138	2,988	155,267	41,905	34*	7,553	34,318	36,471
Louisiana Ry. & Nav. Co.	343	70,676	11,695	87,275	22,521	12,423	3,222	38,521	4,928	81,615	5,660	.....	3,750	1,910	20,407
Mason City & Fort Dodge	386	116,036	33,385	159,066	19,136	21,804	1,710	64,672	642	107,964	51,102	400	6,000	45,502	12,469
Morgans L. & Tex. R.R. & S.S. Co.	351	442,454	79,907	553,590	77,541	42,970	9,535	183,130	12,079	325,255	228,335	863	14,900	214,298	73,086
Nevada & California	379	61,400	25,802	91,404	14,715	15,403	920	33,249	1,798	66,085	25,319	209*	6,000	19,710	‡114,164
New Orleans & North Eastern	196	213,313	44,792	277,240	26,957	51,943	7,149	86,129	10,830	182,648	94,592	736*	8,500	85,356	‡3,102
New York, Philadelphia & Norfolk	112	183,132	27,137	224,842	15,187	41,351	2,715	85,485	10,234	154,972	69,870	.....	6,215	63,655	21,877
New York, Susquehanna & Western	151	130,600	46,709	203,975	20,711	23,167	1,508	72,050	3,794	121,230	82,745	3,225*	15,089	64,431	‡450
Peoria & Eastern	352	170,202	52,868	241,644	28,424	37,854	4,853	92,600	5,173	168,904	72,740	.....	9,505	63,235	26,775
Pittsburgh & Lake Erie	191	841,611	93,616	965,533	150,021	73,724	16,546	234,104	19,831	494,226	471,307	302*	17,500	453,505	‡217,170
St. Joseph & Grand Island	319	91,566	29,489	131,865	23,742	13,726	5,232	43,766	3,482	89,948	41,917	120*	25	41,772	5,104
San Antonio & Aransas Pass	727	280,648	62,915	361,394	52,634	38,073	4,582	130,024	9,131	234,444	126,950	.....	8,500	118,450	62,441
Santa Fe, Prescott & Phoenix	257	86,708	29,727	123,408	18,310	9,964	2,388	28,220	5,167	64,049	59,359	.....	.....	59,359	‡4,383
Texas Central	268	105,142	36,164	148,166	15,776	13,984	1,115	46,444	5,659	82,978	65,188	.....	1,969	63,219	18,884
Vicksburg, Shreveport & Pacific	171	73,014	42,893	125,148	17,561	28,794	3,914	36,266	4,162	90,697	34,451	1,800*	7,200	25,361	7,069
Virginia & South Western	183	92,877	11,919	105,741	13,721	18,729	873	32,923	3,392	69,638	36,103	.....	5,500	30,603	13,919
Western Maryland	543	424,767	52,748	498,715	59,299	80,085	6,695	165,080	11,575	322,734	175,981	.....	16,500	159,481	‡27,838
Wisconsin, Minnesota & Pacific	271	46,620	13,781	64,502	11,521	7,838	303	21,335	290	41,287	23,214	2	2,580	20,636	5,494
FIVE MONTHS OF FISCAL YEAR.															
Charleston & Western Carolina	340	$407,360	$115,604	561,585	$113,696	$75,001	$11,870	$212,129	$16,284	$428,980	$132,605	.....	$20,500	$112,105	$32,304
Chicago, Cincinnati & Louisville	285	406,380	133,366	567,496	159,095	126,378	38,142	236,468	29,416	589,499	22,003*	.....	16,250	38,253†	‡52,133
Chicago, Indiana & Southern	329	973,279	113,867	1,125,585	156,264	219,791	38,055	437,947	33,901	885,958	239,627	$9,550	75,000	174,177	‡1,397
Chicago, Peoria & St. Louis	255	497,190	157,160	687,374	99,637	155,054	30,347	266,692	23,672	575,402	111,972	.....	23,000	88,972	‡5,238
Chicago, Rock Island & Gulf	493	816,299	313,945	1,193,474	310,011	102,931	30,561	459,402	42,352	945,257	248,217	946*	16,891	230,380	‡34,295
Cleveland, Akron & Columbus	210	585,014	203,576	852,713	107,032	142,123	12,041	267,234	14,877	543,307	309,406	.....	33,077	276,329	‡5,092
Cleveland, Lorain & Wheeling	194	1,758,174	103,496	1,988,734	175,505	322,782	30,277	599,980	28,797	1,157,341	831,393	.....	47,032	784,361	‡176,416
Colorado Midland	338	723,931	190,588	1,034,464	137,272	129,741	48,637	406,281	29,521	751,452	283,012	527*	42,000	240,485	‡21,740
Cumberland Valley	162	764,337	264,209	1,079,152	111,015	95,093	18,833	319,925	25,452	570,318	508,834	3,221	18,565	493,490	‡59,247
Detroit & Mackinac	348	313,003	133,078	473,352	49,794	70,467	9,789	156,317	14,918	301,285	172,067	1,834*	33,282	136,951	1,383
Duluth & Iron Range	168	4,460,504	98,505	4,596,167	432,393	265,671	1,604	664,320	40,607	1,404,595	3,191,572	16,734	184,957	3,023,349	‡247,198
Elgin, Joliet & Eastern	239	997,017	254	1,035,326	114,168	169,403	12,154	315,949	31,756	643,430	391,896	.....	47,500	344,396	‡92,092
Evansville & Terre Haute	310	595,572	261,920	951,953	140,809	120,747	17,852	278,506	31,292	589,206	362,747	1,424*	45,175	316,148	‡2,691
Fort Worth & Denver City	454	1,333,306	778,771	2,209,539	339,531	291,312	38,789	644,207	68,354	1,382,193	827,346	3,209	43,533	787,022	39,322
Fort Worth & Rio Grande	196	304,031	145,699	476,748	67,568	49,302	12,994	163,260	24,459	317,583	159,165	.....	5,952	153,213	121,159
Georgia	307	836,769	323,251	1,232,760	262,133	173,565	41,210	501,252	33,906	1,012,066	220,694	.....	8,125	212,569	‡52,900
Gulf & Ship Island	307	558,827	154,143	758,690	164,093	125,657	7,214	258,817	35,700	591,481	167,209	.....	18,425	148,784	‡84,094
Houston, East & West Texas	191	357,506	117,069	502,659	86,801	39,232	6,574	150,592	15,551	298,750	203,909	.....	11,828	192,081	49,020
Kanawha & Michigan	177	875,182	146,902	1,044,017	179,193	243,990	11,801	302,643	13,597	751,224	292,793	93*	33,332	259,368	172,482
Louisiana Ry. & Nav. Co.	343	320,059	51,926	405,780	118,495	58,660	14,985	183,009	24,766	399,915	5,865	.....	15,750	9,884†	36,323
Mason City & Fort Dodge	386	584,290	206,201	841,896	106,639	108,794	8,576	317,702	3,173	544,884	297,013	2,533	30,000	269,546	12,511
Morgans L. & Tex. R.R. & S.S. Co.	351	1,402,336	409,747	1,928,043	340,962	215,390	42,296	727,629	60,066	1,386,343	541,700	1,482*	74,500	465,718	265,443
Nevada & California	379	262,255	115,914	415,298	72,713	59,003	3,947	154,087	9,714	299,464	115,834	158*	34,067	81,609	‡373,095
New Orleans & North Eastern	196	901,601	224,941	1,203,450	125,579	228,942	36,922	396,136	48,601	836,180	367,270	.....	35,500	331,770	‡27,910
New York, Philadelphia & Norfolk	112	936,906	171,046	1,187,893	91,950	203,185	15,582	422,356	57,027	790,100	397,793	.....	31,075	366,718	‡112,440
New York, Susquehanna & Western	151	650,190	266,208	1,032,644	130,888	108,722	7,234	362,761	19,504	629,109	403,535	12,126*	44,392	347,017	19,820
Peoria & Eastern	352	804,724	308,997	1,216,069	158,966	172,013	25,843	453,372	22,120	832,314	383,755	.....	41,924	341,831	‡30,694
Pittsburgh & Lake Erie	191	4,668,492	546,588	5,369,851	652,169	449,261	66,772	1,176,875	107,328	2,452,405	2,917,446	1,435*	87,500	2,828,511	‡1,136,562
St. Joseph & Grand Island	319	497,150	176,207	731,804	108,213	71,243	25,908	222,558	18,458	446,380	285,424	369	21,064	264,729	‡11,457
San Antonio & Aransas Pass	727	1,325,774	370,957	1,782,826	233,643	180,228	20,516	611,765	43,425	1,089,577	693,249	.....	44,700	648,549	153,346
Santa Fe, Prescott & Phoenix	257	386,446	133,799	554,301	95,966	45,915	11,498	129,376	22,755	305,510	248,791	.....	.....	248,791	‡66,562
Texas Central	268	311,889	181,949	524,116	59,565	68,566	4,958	185,702	20,324	339,115	185,001	.....	9,985	175,016	3,831
Vicksburg, Shreveport & Pacific	171	323,350	202,347	568,036	82,497	124,482	16,841	173,547	20,506	417,873	150,163	.....	30,400	119,763	22,499
Virginia & South Western	183	445,661	76,343	529,948	58,669	83,441	4,501	146,955	18,274	311,840	218,108	.....	19,803	198,305	43,384
Western Maryland	543	2,056,468	407,082	2,584,950	299,430	369,845	36,904	787,823	57,692	1,551,694	1,033,256	.....	82,500	950,756	‡21,453
Wisconsin, Minnesota & Pacific	271	218,747	81,255	321,985	75,579	32,166	1,452	110,818	1,342	221,357	100,628	95	12,879	87,844	24,290

*Deficit. †Loss. ‡Decrease.

Capacity of New York Subway.

Bion J. Arnold, in his sixth report to the New York State Public Service Commission, First district, discusses the ultimate capacity of the subway lines. The subway was opened October 27, 1904. The ticket sales for 1905 were 116,209,313, for 1906 149,778,370, for 1907 182,559,990, and for 1908 220,991,212. For the year ended June 30, 1908, different systems carried passengers as follows:

New York subway	200,415,050
Manhattan elevated lines	282,870,590
London underground tubes	160,000,998
Chicago elevated roads	147,267,113

The local trains earn more money per car-mile than the express trains. Mr. Arnold finds that a local train averages $46.30 for an average journey of nine miles in one direction, and as these trains are composed of five cars each the income per car-mile is $1.03 for rush hour service. The income from an average express train is $46.70, slightly more than that from the local train, but as the express train consists of eight cars and the length of haul averages 15.36 miles the income per car-mile is only 39 cents.

To be self-sustaining on the present 5 cent fare basis Mr. Arnold concludes that the road should have an average income of at least one cent per passenger-mile. In other words, with a uniform fare of 5 cents the average length of ride should not exceed five miles.

The average length of travel on express trains is now five and a half miles, or slightly above the critical average, whereas the average length of ride on the local trains is but two miles. The problem for the future, supposing the 5 cent fare to be retained, will be to find a way to handle short haul passengers in short haul cars and to make enough profit on the short haul business to be able to sustain the loss due to the long haul burden.

The local trains in the present subway are shown by experimental counts of passengers to have twice the earning power of the express trains, and the development of the short haul business must be encouraged by furnishing a convenient, rapid, safe and comfortable service of ample capacity.

Traffic Club of Chicago.

The annual dinner of the Traffic Club of Chicago took place at the Congress Hotel, Chicago, on the evening of January 27. The speakers and their subjects were as follows: Joseph E. Ransdell, Representative in Congress from Louisiana and President of the National Rivers and Harbors Congress, "Shall the Government Issue Bonds to Improve Its Waterways?" George F. Stone, Secretary Chicago Board of Trade, "The Progress of Opportunities;" Charles E. Kramer, "The Humor of It." The presidents and vice-presidents of the railways entering Chicago were guests of honor. The dinner was attended by about 300 persons.

Opposition to Rate Reduction in Texas.

J. W. Graves, President of the Texas Division of the Travelers' Protective Association, says that the traveling men of Texas are opposed to any reduction in passenger fares, but where good passenger service is not maintained, passengers ought to be permitted to ride on freight trains.

Twenty-one citizens of Dawson County, in West Texas, have sent to Governor Campbell a signed protest against the recommendation in his annual message for the passage of a 2-cent fare law. They say that there are thousands of bushels of corn in Dawson County lying out on the prairie in ricks and piles, worthless, because of the long distance to a railway, and that the development of West Texas will be indefinitely postponed unless the state adopts a less hostile attitude toward railways. The protestants say:

"While you no doubt seek to benefit all, you benefit only those who live in that part of the state where railways are abundant and transportation facilities ample.

"Those sturdy pioneers who have come here ahead of the road and of population are almost robbed of the fruits of their labors because of the lack of markets and the high price of imports. You will turn back the wheels of time for twenty years, so far as the development of this great section of the state is concerned. We have come here believing we should soon have railway facilities. But the prospect of a continued lack has fallen like a pall upon us. Hope has almost fled and many of us are heartsick."

Railroad Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Newman Erb has been elected President of the Wisconsin Central, succeeding William A. Bradford.

Robert C. Wight, Secretary, and C. O. Kalman, General Auditor, of the Chicago Great Western, have resigned.

J. M. Baxter, Assistant Treasurer of the Lehigh Valley, has been elected Treasurer, succeeding W. C. Anderson, resigned. H. J. McQuade succeeds Mr. Baxter.

Judson Harmon, Receiver of the Cincinnati, Hamilton & Dayton, has withdrawn his resignation at the request of the court and will continue as Receiver.

Edison J. Chamberlin, formerly General Manager of the Canada Atlantic, has been appointed Vice-President and General Manager of the Grand Trunk Pacific, succeeding F. W. Morse, resigned.

A. E. Sweet, General Superintendent of the Southwestern district of the Chicago, Rock Island & Pacific, with office at Topeka, Kan., has been appointed Assistant to the Second Vice-President, with office at Chicago.

John Davis Caldwell has been elected Secretary of the Chicago & North Western, as previously stated in these columns. He was born July 4, 1863, at Lynn, Mass. After a school education he began railway work in 1880 as telegraph operator of the Delaware & Chesapeake, now a part of the Pennsylvania. From 1882 to 1884, he was telegraph operator and subsequently a clerk in the Motive Power Department of the Northern Central and Baltimore & Potomac, both of which roads are now parts of the Pennsylvania. From 1884 to 1885 he was a telegraph operator and later in the same year became Secretary to the Superintendent of Motive Power of the Denver & Rio Grande. He was appointed Secretary to the President of the Chicago & North Western on July 20, 1885, and remained in this position until elected Secretary, on January 12.

John D. Caldwell.

W. C. Brown, President of the New York Central & Hudson River and of other New York Central lines, has been elected President of the Cleveland, Cincinnati, Chicago & St. Louis and the Pittsburgh & Lake Erie, succeeding W. H. Newman, resigned, effective February 1.

A. B. Fall, General Counsel of the Sierra Madre & Pacific and of the Rio Grande, Sierra Madre & Pacific, has been elected also President of the Sierra Madre & Pacific, succeeding H. R. Nickerson, who remains President of the Rio Grande, Sierra Madre & Pacific.

James Grant has been elected President of the Kalamazoo, Lake Shore & Chicago, succeeding S. B. Monroe. George L.

Craig has been elected Vice-President and Traffic Manager, succeeding W. H. Cochrane. H. J. Schmeil, who has been appointed Assistant Traffic Manager, has been elected also Secretary and Auditor, succeeding James Grant. S. B. Monroe, heretofore President, has been elected Treasurer, succeeding F. G. Dewey.

Operating Officers.

H. M. Levinson, Superintendent of the Sierra Madre & Pacific, has been appointed General Manager.

James A. Donovan, formerly with the Nickel Plate Fast Freight Line, has been appointed Manager of the Lemac Carriers Co., with office in the Old Colony building, Chicago.

W. S. Martin, Assistant General Manager of the Denver & Rio Grande and the Rio Grande Western, has assumed the duties heretofore devolving upon the General Superintendent of the Denver & Rio Grande, and that position has been abolished.

P. B. Vermillion has been appointed Assistant Superintendent of the Chicago Great Western, at St. Joseph, Mo. W. G. Hunter is appointed Assistant Superintendent, at Des Moines, Iowa. The position of Trainmaster of the Southwest division has been abolished.

Charles B. Rodgers, whose appointment as General Manager of the St. Louis, Brownsville & Mexico has been noted in these columns, was born October 4, 1858, at West Point, Iowa. After a public school education he began railway work late in 1871, at Chariton, Iowa, as telegraph messenger on the Burlington & Missouri River, now part of the Chicago, Burlington & Quincy. In 1871 he was appointed an operator on the West Iowa division, and in 1874 he was made cashier and operator at the freight station in Omaha, Neb. In 1878 he was made chief clerk in the Superintendent's office, at Lincoln, Neb., and on March 1, 1881, was appointed Roadmaster of the Western division at Red Cloud, Neb. On June 1, 1882, he was made Trainmaster at Wymore, Neb., and three years later was appointed Assistant Superintendent of the Southern division, at Wymore, Neb. On March 1, 1889, he was appointed Superintendent of the Wymore division, at Wymore, where he remained until he resigned to take his new position on January 1.

Traffic Officers.

H. J. Schmeil has been appointed Assistant Traffic Manager of the Kalamazoo, Lake Shore & Chicago.

S. K. Martin has been appointed Commercial Agent of the Chicago, Rock Island & Pacific at Denver, Colo.

G. H. Robinson has been appointed Commercial Agent of the Georgia Southern & Florida, at Tampa, Fla., succeeding George Holden, resigned.

W. G. Yager has been appointed Traveling Freight Agent of the Nashville, Chattanooga & St. Louis, at Louisville, Ky., succeeding W. T. Vandenburgh, resigned.

Raymond Kelly, Commercial Agent of the Minneapolis & St. Louis, at St. Paul, Minn., has been appointed Commercial Agent of the Iowa Central and the Minneapolis & St. Louis, at St. Louis, Mo.

James R. Keith, Traveling Freight and Passenger Agent of the Illinois Central, at San Francisco, Cal., has resigned to become a member of the firm of Hoffman & Keith, 322 Montgomery street, San Francisco.

E. T. Munger, Superintendent of Motive Power and Equipment of the Metropolitan West Side Elevated of Chicago, has been appointed General Superintendent of the Hudson & Manhattan, with office at New York.

O. T. Fagg, Traveling Freight Agent of the Iowa Central, at Peoria, Ill., has been appointed Traveling Freight Agent of the Iowa Central and the Minneapolis & St. Louis, at Minneapolis, Minn., succeeding W. M. Hardin, promoted.

C. E. Crane, whose resignation as Division Freight Agent of the Lehigh Valley has been announced in these columns, has been appointed General Eastern Agent of the Kansas City Southern, in charge of seaboard territory, with office at New York.

W. L. Sargent has been appointed Traveling Immigration Agent of the St. Louis, Iron Mountain & Southern, the Texas & Pacific and the International & Great Northern, at Ft. Worth, Tex. A. H. Sevier has been appointed Traveling Immigration Agent, at St. Louis, Mo. R. R. Claridge has been appointed Traveling Immigration Agent, at Palestine, Tex.

G. B. Albright, Assistant General Freight Agent of the Chicago, Rock Island & Pacific, the Chicago, Rock Island & El Paso and the St. Louis, Kansas City & Colorado, at Kansas City, Mo., has been appointed General Freight Agent, with office at Kansas City, Mo. F. J. Shubert, Assistant General Freight Agent at Chicago, has been transferred as Assistant General Freight Agent to Kansas City. J. C. La Coste succeeds to the duties of Mr. Shubert, being given the title of Chief of Tariff Bureau at Chicago.

S. G. Lutz, whose appointment as Freight Traffic Manager of the Iowa Central and the Minneapolis & St. Louis has been announced in these columns, was born at Mt. Morris, Ill., December 8, 1868. He began railway work in October, 1890, as stenographer for the Traffic Manager of the Iowa Central. He filled various clerical positions in the Traffic Department until February 1, 1898, when he was appointed Assistant General Freight Agent, with office at Marshalltown, Iowa. On January 1, 1902, his headquarters were moved to Peoria, Ill., where he was given charge of through traffic. In February, 1905, he was made also Assistant General Freight Agent of the Minneapolis & St. Louis. His recent appointment as Freight Traffic Manager of both roads was made on December 16, 1908.

Engineering and Rolling Stock Officers.

P. A. McCarthy, Chief Engineer of the Groveton, Lufkin & Northern, has resigned to become Chief Engineer of the San Diego, El Paso & St. Louis.

W. R. Hastings has been appointed Superintendent of Construction of the Signal Department of the Chicago, Rock Island & Pacific, with office at Chicago.

A. L. Kendall, General Foreman of Car Shops of the New York Central & Hudson River at West Albany, has resigned to become General Salesman for the W. P. Taylor Company, Buffalo, N. Y.

T. L. Burton has been appointed General Inspector in charge of air brake, steam heat and car lighting equipment of the Philadelphia & Reading, and will also perform such other duties as may be assigned to him.

M. P. Paret, Chief Engineer of the Kansas City, Mexico & Orient, has resigned to engage in the practise of Consulting Engineer. Until Mr. Paret's successor has been appointed the Engineering Department of that road will be in charge of W. W. Colpitts, Assistant Chief Engineer.

C. M. Larson, who has been connected with the Tax Commission and the Railroad Commission of Wisconsin for several years in connection with railway inspection and appraisal work, has been appointed Real Estate Engineer of the Toledo, St. Louis & Western and the Chicago & Alton, with office at Chicago.

J. M. Stark has been appointed Engineer in Charge of Construction of Extension of the Chicago, Rock Island & Gulf from Wildorado, Tex., to the Texas-New Mexico state line and Engineer in Charge of Construction of the Tucumcari & Memphis, from the Texas-New Mexico state line to Tucumcari, N. Mex., with office at Tucumcari.

E. J. Ayars has been appointed Supervisor of Division 28 of the Pennsylvania, having jurisdiction over the track between Bryn Mawr avenue, Philadelphia, and Mile Post 39, including the Pencoyd, Phoenixville and Royersford branches of the Schuylkill division, succeeding J. P. Carlton, promoted. H. S. Trimble has been appointed Supervisor of the Pennsylvania & Northwestern division and branches, succeeding W. S. Wilson, transferred.

William G. Atwood, whose appointment as Chief Engineer of the Lake Erie & Western has been announced in these columns, was born on August 4, 1872, at Fredonia, N. Y. He

received his education at Cornell University, graduating in the class of 1892. He began railway work on the Lake Street Elevated, Chicago, in 1893, and in 1895 he was appointed Assistant Engineer for the City of Chicago on the Southwest Land Tunnels. In 1897 he was appointed Mining Engineer and United States Deputy Surveyor for Alaska, and in 1901 he was made Superintendent of Construction of the Puget Sound Bridge & Dredging Co., Seattle, Wash. From 1902 to 1906 he was Division Engineer, Superintendent of Construction and Assistant Engineer of Construction of the Alaska Central. From 1906 until his recent appointment he was Locating Engineer of the Lake Shore & Michigan Southern and Division Engineer in charge of Construction of the Cleveland Short Line, a part of the Lake Shore & Michigan Southern.

Purchasing Officers.

Alfred Anderson has been appointed Purchasing Agent of the Metropolitan Street Railway, New York.

OBITUARY.

J. D. Tenbroeck, formerly Traveling Passenger Agent of the Union Pacific, died at Hillsdale, N. J., on January 19.

Edward Keller, formerly Traveling Engineer of the Atchison, Topeka & Santa Fe and later connected with the Colorado Fuel & Iron Co., died suddenly from heart disease on January 17, at Trinidad, Colo.

James A. Rumrill, a director of the Boston & Albany and President of the leased lines, died of pneumonia on January 20. He was born in New York; was a graduate of Harvard University and graduated in 1861 from the Harvard law school, and after practicing law for some years became Secretary of the Western Railroad, now part of the New York Central & Hudson River. He later became Vice-President of the Boston & Albany.

Railroad Construction.

New Incorporations, Surveys, Etc.

ABILENE & SOUTHERN.—Press reports indicate that grading is about completed from Abilene, Tex., southwest to Winters, 38 miles, and that track laying is under way; also that it has not as yet been decided whether construction will be continued south of Ballinger. (Nov. 12, p. 1375.)

ALBERTA & GREAT WATERWAYS.—Application has been made for a charter by Wallace McDonald, of Edmonton, Alb., for this company. The plans call for a line to be built from Edmonton, Alb., northeast to Fort McMurrary, with a number of branches, aggregating about 300 miles.

ALTOONA, HOLLIDAYSBURG & BEDFORD SPRINGS (ELECTRIC).—This company, which was organized about two years ago to build a line from Altoona, Pa., east to various important cities, recently elected John G. Burns President. Work is to be started shortly on the line, which, it is understood, will be eventually extended west to Pittsburgh. F. W. Patterson, of Pittsburgh, is Chief Engineer.

ALTUS, ROSWELL & EL PASO.—Press reports say that announcement is made that construction work on the line will be started at several places early in February. Funds are available to push the construction work. The projected route is from Altus, Okla., on the Kansas City, Mexico & Orient, west to Hollis and eventually to Roswell, N. Mex., a total of 286 miles. Grading has been finished in Oklahoma on 33 miles, and on 22 miles near Lubbock, Tex. About 20 teams are now at work and this number is to be increased to 120 shortly. Edward Kennedy, President, and H. Fielder, Chief Engineer, Altus. (August 28, p. 838.)

ATLANTIC SHORE LINE (ELECTRIC).—Press reports say that plans are being made to extend this railway from Sanford, Me., north through Alfred, Limerick, Kezar Falls and Fryeburg to Rumford Falls, about 120 miles.

CABANO RAILWAY.—Incorporation has been asked for by this company from the Canadian Parliament to build a line from a point at Long Lake, Que., on the Grand Trunk Pacific (National Transcontinental) thence easterly following the valley of the Cabano river to Cabano on Lake Temiscouata. A. Fraser, Cabano, Que., is solicitor for the company.

CAROLINA, CLINCHFIELD & OHIO.—A report from Atlanta, Ga., indicates that work is completed between St. Paul, Va., and Spartanburg, S. C., and that the line is practically ready for operation between Moccasin Gap, Va., through eastern Tennessee and western North Carolina to Marion, N. C. Extensive preparations were also reported being made for the development of the Clinchfield coal district of southwest Virginia. (December 25, p. 1664.)

CANADIAN NORTHERN.—The Edmonton & Slave Lake, now in operation from Edmondton, Alb., north to Morinville, 23 miles, will apply at the next session of the Canadian Parliament for an extension of time to complete the line via Athabasca Landing and the Lesser Slave lake to Peace river, a total of about 400 miles. (R. R. G., May 15, p. 686.)

CHICAGO, ROCK ISLAND & PACIFIC.—President B. L. Winchell says that construction work on the cut-off from Amarillo, Tex., to Tucumcari, N. Mex., will be resumed in the spring and that if possible the entire line to Tucumcari will be finished during the coming season. The line is now built to Eldorado, 21 miles west of Amarillo. The distance from Eldorado to Tucumcari, which it is hoped to cover this year, is 90 miles. The completion of the Amarillo-Tucumcari line will give the Rock Island-Frisco system, via Oklahoma City, the shortest line from St. Louis to Tucumcari and also a direct and the shortest line from Memphis to Tucumcari.

CLARION & EAST BRADY (ELECTRIC).—This company has been organized to build an electric line from Clarion, Pa., southwest via Sligo and Rimersburg to East Brady, 25 miles. G. E. Arnold, T. S. Arnold and F. M. Arnold, all of Clarion, are back of the project.

CLEVELAND, CINCINNATI & INDIANAPOLIS (ELECTRIC).—According to press reports announcement has been made that a new line from Seville, Ohio, southwest to Mansfield, 42 miles, has been finished, and in a few days regular train service will be started between Cleveland and Mansfield. The company owns the old Ohio Central line between Mansfield and Bucyrus, and the Columbus, Delaware & Marion from Bucyrus to Columbus. Through these lines service to Cincinnati, Ohio, and Indianapolis, Ind., is to be established. At a recent meeting F. E. Myers, of Ashland, was elected President.

COLORADO & SOUTHERN.—Press reports say that the Trinity & Brazos Valley will shortly begin work improving its line from Mexia, Tex., north to Cleburne. The bridges are now being rebuilt and ballasting will commence soon.

COBALT RANGE.—Application will be made by this company to the Canadian Parliament for an extension of time to build lines already authorized and in addition to build an extension in a westerly direction from Haileybury, Ont., via Bucke, Firstbrook Barr, or Hudson, Lundy, Auld, Cane or Henwood, Barber, Tudhope or Bryce and James in the Nipissing district, to Elk lake, and thence by way of Smyth and unsurveyed portions of the Nipissing district to Gowganda lake; from its proposed line from Ville Marie to Opasitica lake, thence northerly to the Grand Trunk Pacific (National Transcontinental). MacCracken, Henderson, McDougal & Green, of Ottawa, are solicitors for the company.

COLORADO & MEXICO.—The incorporators of this company include Walter Douglas, E. E. Ellinwood, M. J. Cunningham, M. J. Brophy and John Boler, all of Bisbee, Ariz. E. E. Ellinwood is attorney for the company. (Jan. 8, p. 88.)

EDMONDTON & SLAVE LAKE.—See Canadian Northern.

GILMORE & PITTSBURGH.—An officer writes that this company, which will build a line from Armstead, Mont., west to Salmon, Idaho, will let contracts for grading, track laying and bridges about the first of February. The bids being asked cover 120 miles of line in Montana and Idaho, including a 750-ft. tunnel. Bidders must be prepared to begin work before March 1, 1909. W. A. McCutcheon, President, and T. H. Bacon, Chief Engineer, Machesney building, Pittsburgh, Pa.

Grand Trunk Pacific.—An officer writes that additional contracts will probably be let in the near future for building about 300 miles on the mountain section. (Jan. 1, p. 36.)

Hudson & Manhattan.—President McAdoo has announced that the downtown tubes, from Jersey City, N. J., under the Hudson river to Cortlandt street, New York, will be opened by July 1, 1909. Trains will be run on a three-minute headway. The uptown tubes, from Hoboken to Christopher street and thence northerly, have been in operation for about a year.

Joliette & Lake Manuan Colonization.—Application is being made to the Canadian Parliament for an extension of time to build from Joliette, Que., northerly to Ste. Emilie de l'Energie, thence north and northwesterly to St. Michel des Saints and to Lake Manuan, about 150 miles. Desaulniers & Vallee, Montreal, Que., are solicitors for the company.

Mexican Central.—Reports from Mexico indicate that a cut-off line is being built to connect with the Mexican International in the vicinity of Monterey, Mex. The object of this new line is to shorten the distance between points on the Mexican International and Saltillo by about 75 miles.

Mexican International.—See Mexican Central.

Mexican Roads.—Reports from the City of Mexico indicate that the aid of the state governments concerned is to be enlisted in the building of extensions of the federal system of railways. Public knowledge of the inauguration of this new policy has just been obtained through an agreement entered into by the Governor of Durango on behalf of that state and the National Lines of Mexico. It is said that under the terms of this contract the state of Durango guarantees an income of 6 per cent. on the amount of capital invested in building an extension of the Mexican International, one of the merger lines, from Durango to a tract of timber about 100 miles west. This extension is to be the first link in a much discussed connection between Durango and the port of Mazatlan on the Pacific coast in Sinaloa. Survey for this proposed extension is said to have been made several years ago after some difficulty in locating a route across the Sierra Madre range. It is further reported that the federal government will expect similar guarantees of interest charges from other states where extensions of the merger system are proposed.

Missouri, Kansas & Texas.—An officer writes that there is no truth in the newspaper reports that this company has under consideration the question of double-tracking its line betweene Dallas, Tex., and Waxahachie, although double-track work is now in progress on other parts of the system. Between Dallas and Waxahachie sidings are being lengthened and other improvements for handling heavier traffic are being made, which it is thought will be sufficient to accommodate the traffic. (October 2, p. 1076.)

New York, Philadelphia & Norfolk.—See Pennsylvania.

Northeastern Railway.—Application will be made by this company to the Quebec Legislature for an extension of time to build lines as follows: From near the Gatineau river, Quebec, east to Nominingue; from point near Ville Marie, Ont., on Lake Temiskaming, east, south of Lakes des Quinze, Victoria and Kakebonga, to Quebec; from Lake Temiskaming north to the Grand Trunk Pacific (National Transcontinental) near Lake Abitibi; from near Lake Kakebonga south to Maniwaki. Desaulniaers & Vallee, Montreal, Que., are solicitors for the company.

Nueces Valley, Rio Grande & Mexico.—An officer writes that this company, organized to build a line from Eagle Pass, Tex., east to Aransas Pass, about 300 miles, has given a contract to the J. F. Burns Construction Co., of Devine, Tex., for building a section of 32 miles from a point on the International & Great Northern at Artesia, Tex., west to Asherton, which will be the western terminus for some time to come. Grading has been finished for 10 miles and track laying is to begin February 1. The line is to be laid with 65-lb. rails, and it is expected to begin work from Artesia east to Aransas Pass, and west from Asherton to Eagle Pass, in the near future. Asher Richardson, President, Carrizo Springs, and R. H. Gresham, Chief Engineer, San Antonio.

Oklahoma & Golden City.—An officer writes that this company, which was incorporated in Oklahoma with a capital of $12,000,000 to build a line from Pawhuska, Okla., northeast through Bartlesville, Miami, Joplin, Mo., Carthage, Golden City, Stockton, Humansville, Climax Springs and Brazito to Jefferson City, and also a branch from Climax Springs, Mo., south to Springfield, will pursue the following order in the work of construction. First, from Golden City, Mo., northeast to Stockton, and from Golden City southeast to Carthage. When this is completed, work will begin from Pawhuska, Okla., to the northeast and from Jefferson City to the southwest, also continuing work on the lines in both directions from Golden City. Upon the completion of these lines, work will be begun on the branch from Climax Springs, Mo., south to Springfield. Contracts for grading, track laying, etc., will be let in April. Grades will be under 1 per cent. with no bad curves. There will be five large bridges and a number of smaller ones, also some trestle work. Officers of this company are: W. S. Pope, President, Jefferson City; J. A. Griesel, General Manager, Golden City; E. M. Dempsey, Vice-President, and W. S. Hawkins, Chief Engineer, Pawhuska, Okla.

Oklahoma Roads (Electric).—C. T. Blake is Vice-President of a company which has been granted a franchise by the Hobart, Okla., City Council to operate a street railway. Final arrangements are under way and as soon as these are completed work is to be started on four electric interurban lines to be built from Hobart.

Pennsylvania.—This company is arranging to double-track the line of the New York, Philadelphia & Norfolk, between Salisbury, Md., and Fruitland, a distance of about four miles.

Prince Albert & Hudson Bay.—Application has been made to the Canadian Parliament for incorporation by this company to build a line from Prince Albert, Sask., crossing the Saskatchewan river and northeasterly to the mouth of Nelson river or York Factory on Hudson Bay; also for permission to operate vessels on all navigable waters touched by the railway. F. W. Halliday, Prince Albert, Sask., is solicitor for the company.

Quebec & Oriental.—Application has been made by this company to the Canadian Parliament for an extension of time to build a line from Riviere du Loup, Que., southeasterly through Temiscouata county, to a connection with the Grand Trunk Pacific (National Transcontinental) in either Temiscouata or Kamouraska counties, and to buy railway lines from Metapedia east to Caplin, and from Caplin to Paspebiac, known as the Baie des Chaleurs section of the Atlantic & Lake Superior Railway; also for authority to increase its bonding powers to $45,000 a mile. D. R. Murphy, Montreal, Que., is solicitor for the company.

Southern Pacific (Mexico).—Press reports from Guadalajara, Mex., say that the Southern Pacific of Mexico, previously referred to as the Mexican Pacific Coast, has finished the section on the southern end from Orendain, Mex., on the Mexican Central west to Tiquila, Jalisco, 22 miles. Work on the extension west of Tiquila is being pushed and it is expected to begin operating trains within a few months to Tesquesquite, which will afford transportation facilities to the Hostotpaquillo mining district.

Stamford & Northwestern.—An officer writes that a general contract has been given to P. M. Johnston, Son & Allhands for grading, buildings, bridges, etc., and sub-contract let to J. L. McSpadden for the first five miles out of Stamford. At present there are 250 teams at work and by the middle of February there will be 150 additional. The company was organized last fall to build a line westerly from Stamford in Jones county, Tex., to a point in Dickens county, about 65 miles. L. M. Buie, President, and P. G. Burns, Chief Engineer, Stamford. (January 15, p. 139.)

Temiskaming & Northern Ontario.—Press reports say that this company has plans under consideration for building an extension from Charlton, Ont., to Elk Lake, 28 miles.

Texas State Railroad.—Reports from Palestine, Tex., say that this line, which is being built by convicts from Rusk, Tex., to Palestine, about 30 miles, is nearing completion and that the grading is finished to within three miles of Palestine

and track completed to within seven miles. It is reported that the line will be in operation within a few weeks. (See Texas Roads, November 13, p. 1375.)

TRINITY & BRAZOS VALLEY.—See Colorado & Southern.

VANCOUVER, FRASER VALLEY & SOUTHERN.—Application is being made to Parliament for an act reviving the charter of this company granted in 1906. McPhillips, Tiffen & Laursen, Vancouver, B. C., are attorneys for the company.

WILLIAMSVILLE, GREENVILLE & ST. LOUIS.—This company, operating a line from Williamstown, Mo., to Hiram, contemplates, it is said, an extension from Cascade, Mo., to Fredericktown, for which survey has been made. No bids have yet been received for the construction work. G. A. Long, General Superintendent, Greenville, Mo.

ZINC BELT RAILROAD.—Incorporated in Arkansas, with a capital stock of $1,500,000. to build a line in the northern part of the state, and eventually from Little Rock, Ark., to St. Louis, Mo.

Railroad Financial News.

CENTRAL NEW ENGLAND.—The stockholders of this company, which is controlled by the New York, New Haven & Hartford, are asked to exchange their certificates "of beneficial interest in the shares of stock deposited with the trustee" for stock, thus terminating the 10-year voting trust which began March 14, 1898. The present trustees are William Rockefeller, Charles F. Brooker, Charles Lanier, William Greenough and W. L. Barnett.

CHESAPEAKE & OHIO.—Edwin Hawley and associates have bought the $15,630,000 stock of the C. & O. that was transferred by the Pennsylvania to Kuhn, Loeb & Co. in December, 1906. It would appear that the Hawley interests have acquired control of the Chesapeake & Ohio. Edwin Hawley and his associates now control the Toledo, St. Louis & Western, the Chicago & Alton, the Minneapolis & St. Louis, the Iowa Central and a one-sixth interest in the Hocking Valley. They very recently sold a controlling interest in the Colorado & Southern to the Chicago, Burlington & Quincy. Until the sale by the Pennsylvania of its holdings, the Chesapeake & Ohio has been controlled jointly by the Pennsylvania and the Vanderbilt interests. The capital stock outstanding amounts to $62,799,100.

CHICAGO CITY RAILWAY.—The directors have declared an extra dividend of 3 per cent. on the $18,000,000 capital stock outstanding. During 1908 regular quarterly dividends of 1½ per cent. were paid the same as in 1907, and the present extra dividend of 3 per cent. corresponds with a like extra dividend paid at the end of 1907.

CHICAGO, MILWAUKEE & ST. PAUL.—The company has bought a tract of coal lands in the Bull mountain field near the Pacific coast extension in Yellowstone county, Montana, and has opened two mines.

CHICAGO TERMINAL TRANSFER.—The stockholders' protective committee, George I. Malcom, chairman, says that the holders of about 77,000 of the 81,481 shares of preferred stock have accepted the offer to sell their holdings for $20 a share to a purchaser understood to be the Baltimore & Ohio. The privilege of accepting the offer expires February 1.

CINCINNATI, HAMILTON & DAYTON.—Judson Harmon, receiver, has withdrawn his resignation at the request of the court and will continue as receiver.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—See New York Central & Hudson River.

DENVER & RIO GRANDE.—All of the $10,000,000 6 per cent. notes of 1908-1911-1913 have been exchanged for refunding bonds, of which there are now outstanding $17,500,000. The company is exchanging its stock for the stock of the old Denver & Rio Grande and the Rio Grande Western. The exchange is on the basis of one share of preferred new stock for one share of preferred stock of the old D. & R. G., and one share of new common stock for one share of common stock of the old D. & R. G. For one share of either preferred or common of the Rio Grande Western there is exchanged two shares of preferred stock of the new company.

HIDALGO & NORTHEASTERN.—See National Railways of Mexico.

MEXICAN CENTRAL.—See National Railways of Mexico.

MISSOURI, KANSAS & TEXAS.—Speyer & Co., New York, have bought $3,310,000 first and refunding mortgage 4 per cent. bonds that have been held in the treasury of the M., K. & T.

NATIONAL LINES OF MEXICO.—See Mexican Roads under Railroad Construction.

NATIONAL RAILROAD OF MEXICO.—See National Railways of Mexico.

NATIONAL RAILWAYS OF MEXICO.—The property of the Hidalgo & Northeastern has been transferred to the National Railways of Mexico, and its earnings, previously reported separately, have, since January 1, been included with those of the National Railroad of Mexico. The Hidalgo & Northeastern operates 152 miles of road and was previously controlled by the National Railroad of Mexico. Its road is now known as the National and Hidalgo divisions of the National Railroad of Mexico.

William Salomon & Co., New York, are offering at par a block of Mexican Central collateral trust 5 per cent. notes of 1906-1910. This is part of an authorized issue of $35,000,000, of which $15,740,000 are outstanding. The notes are a direct obligation of the National Railways of Mexico.

NEW YORK CENTRAL & HUDSON RIVER.—E. H. Harriman has been elected a Director of the New York Central & Hudson River, succeeding C. C. Clark. W. C. Brown has been elected a Director, succeeding Samuel F. Barger. Mr. Brown has also been elected a Director of the Cleveland, Cincinnati, Chicago & St. Louis, succeeding Alexander McDonald, resigned. He has also been elected President of the Big Four, succeeding W. H. Newman, who remains, however, a Director of the Big Four.

NEW YORK, NEW HAVEN & HARTFORD.—See Central New England.

NEW YORK STATE RAILWAYS.—The stockholders of the Rochester & Sodus Bay, the Rochester & Eastern and the Rochester Railway have ratified, it is said, the merger of these companies into the New York State Railways. (January 8, p. 90.)

NORFOLK & WESTERN.—Divisional first lien and general mortgage 4 per cent. bonds of 1904-1944 amounting to $10,000,000 have been sold to Kuhn, Loeb & Co. and the Guaranty Trust Co., both of New York. The bonds are part of a total authorized issue of $35,000,000, of which there are outstanding $23,000,000, including the $10,000,000 bonds now sold.

WESTERN MARYLAND.—Blair & Co., New York, have bought $4,000,000 first mortgage 4 per cent. bonds held as collateral by the Deutsche Bank for a $3,000,000 loan to the railway company. When the railway company defaulted on the loan in March, 1908, the bonds were sold at auction and bid in by the bank at 53, leaving a deficiency against the loan of $800,000. The bonds are now worth more than the loan, but a suit has been pending to collect the deficiency.

WISCONSIN CENTRAL.—W. A. Bradford, Jr., G. A. Fernald, T. L. Chadbourne and H. B. Starr have resigned as members of the executive committee and as directors. George J. Gould and T. F. Gates, directors, have resigned, and W. J. Wollman, C. G. Simpson and F. H. Prince have been elected members of the executive committee and directors, and E. N. Foss and Leroy Baldwin and F. H. Prince have been elected directors. Newman Erb, President, has been elected chairman of the executive committee, succeeding W. A. Bradford, Jr.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Coyaz Railway, Brazil, has ordered two locomotives from the Baldwin Locomotive Works.

The Manufacturers' Railway has ordered one locomotive from the Brooks works of the American Locomotive Co.

The Pennsylvania, reported in the *Railroad Age Gazette* of December 18 as having just begun the construction of 15 consolidation locomotives at its Juniata shops, has increased this number to 33 locomotives.

The Canadian Pacific, reported in the *Railroad Age Gazette* of January 22, has ordered 30 Pacific locomotives from the Locomotive & Machine Co., of Montreal.

General Dimensions.

Weight on drivers	135,000 lbs.
Weight, total	214,200 "
Cylinders	21 in. x 28 in.
Diameter of drivers	69 in.
Diameter of trailers	44 "
Boiler, type	Extended wagon top
Boiler, working steam pressure	200 lbs.
Firebox, length	94⅛ in.
Firebox, width	69⅞ "
Tubes, length	19 ft. 6 "
Tubes, outside diameter	(193) 2¼ in.; (22) 5 "

The Grand Trunk Pacific, reported in the *Railroad Age Gazette* of October 30, has ordered 25 American locomotives from the Locomotive & Machine Co., of Montreal.

General Dimensions.

Weight on drivers	74,700 lbs.
Weight, total	120,700 "
Cylinders	18 in. x 24 in.
Diameter of drivers	69 "
Boiler, type	Extended wagon top
Boiler, working steam pressure	200 lbs.
Firebox, length	95¾ in.
Firebox, width	41⅞ "
Tubes, number	210
" length	11 ft. 2¾ in.
" outside diameter	2 "

The Great Northern, as reported in the *Railroad Age Gazette* of January 22, has ordered 20 Pacific locomotives, equipped with superheaters, from the Baldwin Locomotive Works.

General Dimensions.

Weight, on drivers	151,000 lbs
Weight, total	375,200 "
Cylinders	26 in. x 30 in.
Diameter of drivers	73 in.
Boiler, type	Belpaire
" working steam pressure	150 lbs.
" diameter smallest ring	72-in.
Heating surface, tubes	2,847.39 sq. ft.
" " firebox	210.77 "
" " total	3,058.16 "
Tubes, total number	292
" number in superheater	32
" diameter	2¼ in.
" diameter in superheater	5 "
" length	21 ft.
Firebox, length	116¼ in.
" width	66¼ "
" depth, front	72 "
" depth, back	64⅜ "
Grate area	54.15 sq. ft.
Water capacity	8,000 gals.
Coal capacity	13 tons

CAR BUILDING.

The Pere Marquette is asking prices on 50 forty-ton box cars.

The Chicago, Milwaukee & St. Paul is in the market for two buffet library cars.

The Harriman Lines are asking bids on 1,500 refrigerator cars, the contract for which will probably be let in a few days.

The Aurora & Dekalb has ordered one 58-ft. combination passenger and baggage car from Hotchkiss, Blue & Co., Railway Exchange building, Chicago.

Special Equipment.

Brakes	Westinghouse
Curtain material	Pantasote
Heating system	Steam and two Spear stoves
Interior finish	Oak, natural wood
Lighting system	Four double-chandelier oil lamps
Parcel racks	A. & W. 4-ft. sections
Seats	New reversible
Seat covering	Pantasote
Trucks	4-wheel
Wheels	Steel tired

The Cleveland, Akron & Columbus is said to have ordered 100 freight cars from the Standard Steel Car Co. This item is not confirmed.

The Pennsylvania has asked bids on 2,100 new freight cars for the Lines West. These cars are for replacing their proportion of pool freight equipment.

The New York Central Lines are asking prices on from 50 to 80 passenger coaches, three combination smoking and baggage, two smoking cars and 200 thirty-ton stock cars.

The Nevada Northern has ordered two 60-ft. combination passenger, baggage and smoking cars from Hotchkiss, Blue & Co., Railway Exchange building, Chicago.

Special Equipment.

Brakes	Westinghouse
Curtain material	Pantasote
Heating system	Steam and two Spear stoves
Interior finish	Oak, natural wood
Lighting system	Four double-chandelier oil lamps
Parcel racks	A. & W. 4-ft. sections
Seats	Reversible
Seat covering	Pantasote
Trucks	6-wheel
Wheels	Steel tired

The Seaboard Air Line, as reported in the *Railroad Age Gazette* of January 22, has ordered 500 thirty-ton steel underframe ventilated box cars from the South Baltimore Car & Foundry Co.; 200 fifty-ton steel phosphate hopper cars from the Barney & Smith Car Co., and fifty 40 cu. yd. capacity ballast cars from the Rodger Ballast Car Co. All of this equipment is for early delivery.

BOX CARS.

These cars will be 36 ft. long, 8 ft. 2½ in. wide and 7 ft. 6 in. high, inside measurements, and 37 ft. 9¾ in. long, 9 ft. 1¼ in. wide and 12 ft. 8 3/16 in. high, over all. The bodies will have steel frames with wood lining and siding. The underframes will be of steel. The special equipment includes:

Axles	Seaboard standard
Bolsters, body	Pressed steel
Bolsters, truck	Cast steel; American Steel Foundries
Brakes	Westinghouse
Brake-beams	Simplex
Brake-shoes	Seaboard standard
Couplers	Simplex; American Steel Foundries
Doors	Seaboard standard
Door fastenings	Dayton, Jones fixture
Draft gear	Farlow
Dust guards	Bass wood
Journal boxes	Symington
Paint	Seaboard standard
Roofs	Murphy outside metal
Side bearings	Seaboard standard
Springs	" "
Trucks	" "

PHOSPHATE CARS.

These cars will be 34 ft. long at hopper top, 9 ft. 1⅝ in. wide and 7 ft. 5 in. high, inside measurements, and 37 ft. 2 in. long, 10 ft. 8 in. wide and 10 ft. 5¼ in. high, over all. The bodies and underframes will be of steel. The special equipment includes:

Axles	Seaboard standard
Cast steel	American Steel Foundries
Brakes	Westinghouse
Brake-beams	Simplex
Brake-shoes	Seaboard standard
Brasses	M. C. B. standard
Couplers	Simplex; American Steel Foundries
Doors	Seaboard standard
Door fastenings	Seaboard standard
Draft gear	Farlow, twin spring
Journal boxes	Symington; malleable iron
Paint	Seaboard standard
Roofs	⅛-in. steel
Side bearings	Seaboard standard
Springs	"
Trucks	Seaboard standard with Andrews side frames

BALLAST CARS.

These cars will be 40 ft. long, 8 ft. 8 in. wide and 3 ft. high, inside measurements, and 41 ft. 6 in. long, 10 ft. 2⅜ in. wide, inside measurements, and 7 ft. 5 in. high above rail. The bodies will have steel frames with wood siding and the underframes will be of steel. The special equipment includes:

Axles	Seaboard standard
Bolsters, body	Built up
Bolsters truck	Cast steel; American Steel Foundries
Brakes	Westinghouse
Brake-beams	Simplex
Brake-shoes	Seaboard standard
Brasses	M. C. B. standard
Couplers	Simplex
Draft gear	Farlow
Dust guards	Bass wood
Journal boxes	McCord
Paint	Seaboard standard
Side bearings	" "
Springs	" "
Trucks	" "

The New York Central Lines, reported in the *Railroad Age Gazette* of December 4 as being in the market for five postal cars, have ordered 11 of these cars from the Pullman Co.

The Chesapeake & Ohio order of three dining cars from the Pullman Company, reported in the *Railroad Age Gazette* of January 22, is a restoration of an order which was canceled about two years ago. No contracts have as yet been made for freight equipment.

The Seaboard Air Line, reported in the *Railroad Age Gazette* of January 22, has ordered 5 passenger, 2 passenger-baggage, 3 mail-baggage and 5 express cars from the Barney & Smith Car Co. for early delivery. These cars will be 69 ft. 2⅞ in. long, 8 ft. 10⅞ in. wide, 9 ft. 5¼ in. high, inside measurements, and 71 ft. 10 in. long over buffer sills, 10 ft. ⅜ in. wide at eaves and 10 ft. 5$\frac{5}{16}$ in. high. The bodies and underframes will be of wood. The special equipment includes:

Axles	M. C. B.
Bolsters, body and truck	Cast steel; Commonwealth Steel Co.
Brakes	Westinghouse
Brake-beams	Hercules; American Steel Foundries
Brake-shoes	Lappen
Couplers, vestibule cars	Janney, long stem
Couplers, stub-end cars	Janney Bohoup; short stem
Curtain fixtures	National
Curtain material	Pantasote
Draft gear	Seaboard standard
Dust guards	Symington
Heating system	Safety, direct
Journal boxes	Symington
Lighting system	Pintsch gas
Paint	Seaboard standard
Platforms	Standard Steel; Type A
Roofs	Seaboard standard
Side bearings	Woods
Springs	Seaboard standard
Trucks	Seaboard standard, 6-wheel
Ventilators	Seaboard standard
Vestibules	Pullman, wide Type C
Ventilator diaphragms	Carrest
Ventilator trap doors	King
Wheels	36-in. steel tired

IRON AND STEEL.

The Detroit & Mackinac has ordered 1,000 tons of rails from the Illinois Steel Co.

The Isthmian Canal Commission has ordered 7,000 tons of rails from the Pennsylvania Steel Co.

The Toledo, Peoria & Western is said to have ordered 1,000 tons of rails from the Illinois Steel Co.

The Cleveland, Akron & Columbus is said to have ordered 3,500 tons of rails from the Carnegie Steel Co.

The Cincinnati, Hamilton & Dayton is said to have ordered 1,000 tons of rails from the Carnegie Steel Co.

The St. Louis, Brownsville & Mexico has ordered 530 tons of structural steel from the Wisconsin Bridge Co., for use in bridge construction.

The Long Island has given a contract to the American Bridge Co. for about 600 tons of steel for use on the new shed of Old Pier 32, East river, New York City.

The Isthmian Canal Commission will receive bids until February 15 for steel rails, angle bars, tie plates, frogs, switch points, switch stands, rail braces, spikes, track bolts, etc. Circular No. 491.

The Colorado Springs & Cripple Creek District has ordered a tonnage of 75-lb. rails from the Colorado Fuel & Iron Co., sufficient to re-lay 22 miles of track between Colorado Springs, Colo., and Cripple Creek.

The New York, New Haven & Hartford is said to have given an order to the McKenna Process Co. for re-rolling 8,000 tons of 100-lb. rails. It is understood that these rails will be re-rolled into 90-lb. rails for use on sidings.

The Crane Co., Chicago, reported in the *Railroad Age Gazette* of January 22 as being in the market for 500 tons of structural steel for a warehouse at San Francisco, Cal., has placed this order with the Receivers of Milliken Bros.

The Great Northern, reported in the *Railroad Age Gazette* of January 22 as being in the market for 8,000 tons of rails, has placed an order with the Illinois Steel Co. for 6,500 tons. This order is for prompt delivery. In addition to this tonnage, the Great Northern is now getting prices on 18,000 tons of rails for later delivery and is also in the market for 150,000 special rail joints.

RAILROAD STRUCTURES.

ABILENE, TEX.—Local press reports say that surveying for the site of a new roundhouse, between Eighth and Ninth streets, has been begun.

COMANCHE, TEX.—The Texas Railroad Commission has ordered the Ft. Worth & Rio Grande to build a new station at Comanche. Plans for this structure are now being prepared.

DENISON, TEX.—It is reported that a contract has been given to Stewart & Stewart for the new Union station, which is to cost about $250,000, and that work is to be started at once; also that the building will be completed within about six months. (July 10, p. 500.)

NATCHEZ, MISS.—Press reports indicate that G. B. Swift & Co., Chicago, have been given a contract for building the depot of the Mississippi Central. It is understood that the building will include the freight and passenger depot with office rooms and that the building is to be finished in about five months.

NEW YORK, N. Y.—The Long Island has given a contract to Edward B. Jenks, New York, for building the new shed on Old Pier 32, East river. About 600 tons of steel will be used. (See Long Island Railroad under Iron and Steel.)

TACOMA, WASH.—The Great Northern has given the contract to H. Chase & Co., Seattle, Wash., for building its freight terminal buildings. The freight shed will be two stories, of brick construction, 58 ft. x 500 ft., to cost about $30,000. (Jan. 22, p. 189.)

WILLIAMSON, W. VA.—The Norfolk & Western intends to enlarge the pumping station in order to secure a sufficient quantity of water of good quality for terminal facilities. A new pumping plant is now being built by company forces. This pumping plant will be operated by electric power, and a new power house, 50 ft. x 100 ft., sufficient for providing all the necessary electric power, is now being built. The concrete foundations of this building are being built by The E. G. Nave Bros. Co., of Portsmouth, Ohio, and the brick building proper by J. P. Pettyjohn & Co., of Lynchburg, Va. The power house and equipment will cost about $30,000.

WINNIPEG, MAN.—Work will be started soon, it is said, on new union stock yards at Winnipeg as soon as the St. Boniface Council carries out its agreement to open several streets and construct sewers. About $395,000 is to be spent in laying out the yards, exclusive of the buildings. (July 17, p. 549.)

SIGNALING.

The government of British Columbia is in the market for an electric interlocking plant for the Fraser river drawbridge at New Westminster, B. C.

The Kentucky & Indiana Bridge & Railroad Co. is in the market for block signals for its line between 30th street, Louisville, Ky., and Dewey street, New Albany, Ind. The type of signal to be used has not been decided.

The Chicago, Milwaukee & Puget Sound has ordered from the Union Switch & Signal Co. the material for a mechanical interlocking plant at the crossing of the North Pacific at Sinclair, Mont. The machine will be of the Saxby & Farmer type, 20-lever frame, 16 working levers. Distant signals will be power-operated, style B motors without track circuit. No electric locking will be provided. All signals will be two-position upper quadrant.

Iron and Steel Institute Scholarship.

Andrew Carnegie has given the Iron and Steel Institute (England) a fund of $89,000 to establish a research scholarship. The object is to enable college graduates or men trained in industrial work to conduct researches in iron and steel

metallurgy and allied subjects. There is no restriction as to the place of recearch as long as it is properly equipped. The scholarships shall be awarded for one year, but may be renewed instead of making a new selection. The results of the research are to be presented in the form of papers before the institute, and if of sufficient merit the Andrew Carnegie gold medal shall be awarded.

United States Steel Corporation.

The income account of the United States Steel Corporation for the quarter ended December 31, 1908, is as follows:

Net earnings		$26,225,485
Sinking funds on bonds of subsidiary companies	$248,272	
Depreciation and reserve funds	4,965,550	
		5,213,822
Balance		$21,011,663
Interest on U. S. Steel Corp. bonds outstanding	$5,942,354	
Sinking funds on U. S. Steel Corp. bonds, viz.:		
Instalments	$1,012,500	
Interest on bonds in sinking funds	357,109	
	1,369,609	
		7,311,963
Balance		$13,699,700
Net adjustments in sundry accounts		289,183
Total		$13,988,883
Preferred dividend, 1¾ per cent	$6,304,919	
Common dividend, ½ per cent.	2,541,513	
		8,846,432
Surplus for the quarter		$5,142,451
Total surplus		$133,991,154

The above net earnings compare with previous quarters as follows:

Quarter ending.	Net earnings.	Quarter ending.	Net earnings.
Sept. 30, 1908	$27,106,274	Dec. 31, 1905	$35,216,062
June 30, 1908	20,265,756	" 31, 1904	21,466,631
Mar. 31, 1908	18,229,005	" 31, 1903	15,037,182
Dec. 31, 1907	32,534,191	" 31, 1902	31,985,759
" 31, 1906	41,750,125		

The fourth quarter's earnings, by months, for a series of years are as follows:

Year.	October.	November.	December.	Total.
1908	$9,415,668	$8,756,729	$8,053,088	$26,225,485
1907	17,052,210	10,467,252	5,014,728	32,534,192
1906	14,984,925	13,482,464	13,282,735	41,750,125
1905	12,400,306	11,827,215	10,988,542	35,216,063
1904	7,250,204	7,117,417	7,099,010	21,466,631
1903	7,675,141	4,069,901	3,292,139	15,037,181
1902	12,652,707	10,686,906	8,000,000	31,339,613

The unfilled orders on hand, December 31, 1908, were 3,603,527 tons.

This compares with previous quarters as follows:

Quarter ending.	Tons, unfilled orders.	Quarter ending.	Tons, unfilled orders.
Sept. 30, 1908	3,421,977	Dec. 31, 1905	7,605,086
June 30, 1908	3,313,876	" 31, 1904	4,696,208
Mar. 31, 1908	3,765,343	" 31, 1903	3,213,123
Dec. 31, 1907	4,624,553	" 31, 1902	5,347,252
" 31, 1906	8,489,718		

Mr. Faulkner's Observations on Sleepers.

While in Germany I looked into the steel tie question and was assured by the managers of the operating departments of the various roads that they found the life of a steel tie was no longer than that of a wood tie [meaning, presumably, creosoted wood]. Last year I was in Japan and learned that 300 years ago the government began to conserve its forests and replant them, and the result is that they are now selling railway ties to this country and also to Mexico. I purchased 5,000 ties from Japan for our road. A vessel is now unloading at San Francisco ties from the Hawaiian Islands, and next week another vessel is expected. And remember that we are paying a duty of 20 per cent. on each tie brought from a foreign country into the United States.—*E. O. Faulkner, Manager Tie and Timber Department, Atchison, Topeka & Santa Fe.*

Harbor Improvement in Brazil.

According to a consular report, work on harbor improvements at Pernambuco, Brazil, is about to start, and there may be a demand for American dredges and other material. M. Bartissol, 7 Rue Lafayette, Paris, France, has the concession for the work and will have charge of the improvements.

Supply Trade News.

J. M. Hopkins, General Manager of the Camel Co., Chicago, has been elected President of that company.

William H. Dyer has been appointed Master Mechanic of the Valdosta shop of the Southern Locomotive & Car Mfg. Co., Valdosta, Ga.

The Youngstown Car Manufacturing Co., Youngstown, Ohio, has opened a Chicago office at 1508 Fisher building, in charge of Charles B. Owens.

C. B. Goodspeed has been elected a Director of the Buckeye Steel Castings Co., Columbus, Ohio, succeeding R. M. Rowand, resigned. Other directors have been re-elected.

John P. Cosgrow has been appointed District Manager of the Allis-Chalmers Co., Milwaukee, Wis., with office in the El Paso & Southwestern building, El Paso, Tex.

The O. M. Edwards Co., Syracuse, N. Y., are to furnish window fixtures for the Carolina, Clinchfield & Ohio cars being built by Harlan & Hollingsworth. Automatic window design 1-B1 will be used.

E. A. Johnson, who for 12 years has been with the Watson-Stillman Co., New York, has been appointed General Eastern Sales Manager of the Duff Manufacturing Co., Pittsburgh, Pa., with offices at New York, effective February 1.

The Railway Telephone & Electric Co., Chicago, has been incorporated to do a general manufacturing and sales business of electrical appliances. Capital stock, $30,000. The incorporators are: Max W. Zabel, A. Miller Belfield and O. M. Wermich.

The Cold Blast Refrigerator Transit Co., Chicago, has been incorporated with $25,000 capital to manufacture and deal in refrigerator cars and refrigerating apparatus. The incorporators are: Delbert E. Johnson, Walter M. Anthony and William H. Skaggs.

The Carnegie Steel Co., Pittsburgh, Pa., has made a contract with the Chicago City Railway to furnish hereafter all the new car wheels for its rolling stock. The different kinds of wheels now in service will be replaced from time to time with Schoen steel wheels.

The Isthmian Canal Commission is asking bids up to February 8 on wire screens, condenser tubes, locomotive castings, manganese steel bars, chain, wire, valves, drills and other machine tools, pipe cutters, hammers, punchers, files, screws and other hardware.

P. G. Stevens, who has been connected with the advertising department of the *Railroad Age Gazette* in Chicago since the consolidation of the *Railroad Gazette* and *The Railway Age*, has resigned to enter the employ of the *Railway and Engineering Review*, with headquarters at Chicago.

Samuel B. Sheldon, General Superintendent of the Buffalo plant of the Lackawanna Steel Co., New York, has resigned to go to the Bethlehem Steel Co., South Bethlehem, Pa. George F. Downs, Assistant General Superintendent, succeeds Mr. Sheldon; T. H. Mathias succeeds Mr. Downs.

William C. Ennis, heretofore with the American Locomotive Co., New York, has been appointed Eastern Traveling Representative of the Falls Hollow Staybolt Co., Cuyahoga Falls, Ohio. Mr. Ennis has served as Superintendent of Motive Power and Master Mechanic on various railways.

According to a consular report, the Secretary of the Birmingham Chamber of Commerce says that he can furnish the names and trades of British manufacturers who are prepared to negotiate for buying, or working on royalty or other agreed terms, British patents owned in the United States.

V. K. Spicer has been appointed Canadian Manager of the Union Switch & Signal Co., Swissvale, Pa., effective January 31, and will take charge of the Montreal office about March 1. W. E. Foster has been appointed Western Manager, in charge of the Chicago office and district, effective February 1.

M. P. Paret, Chief Engineer of the Kansas City, Mexico & Orient, has resigned that position to go into partnership with E. J. Beard, as Consulting Engineers, with main offices at Kansas City, Mo. Mr. Beard was formerly Principal Assistant Engineer of the Chicago, Rock Island & Pacific, and for the last two years has been Chief Engineer of J. G. White & Co., New York.

The W. K. Kenly Co., Chicago, which is the western representative of the Kalamazoo Railway Supply Co., Kalamazoo, Mich., has appointed the Hofius Steel & Equipment Co., Seattle, Wash., its Pacific coast representative. A complete stock of hand, push and velocipede cars will be carried in Seattle. The Hofius company will also carry a stock of Latimer switch point locks.

Herbert DuPuy, Second Vice-President, has been elected Chairman of the Executive Committee of the Crucible Steel Company of America, Pittsburgh, Pa., succeeding William G. Park, who died on January 19. George E. Shaw, of Pittsburgh, has been elected a Director. John A. Sutton, Third Vice-President, succeeds Mr. DuPuy. Fourth Vice-President C. C. Ramsey succeeds Mr. Sutton. O. H. Wharton succeeds Mr. Ramsey.

The Rockwell Furnace Co., New York, has been awarded the contract covering the complete furnace equipment for the new locomotive shops of the Delaware, Lackawanna & Western at Scranton, Pa. The furnace equipment consists of 35 furnaces operated with 300 B.t.u. water gas, which is made in Loomis Pettibone producers. These shops will be capable of turning out complete locomotives, and are to be in operation in three months.

The Darley Engineering Co., New York, has the following recent orders for 8-in. patented suction ashes conveyors: United States Navy, for Charleston, S. C. (fourth order from the Navy Department); Armour & Co., for South Omaha plant (fourth order from Armour & Co.); American Steel and Wire Co., for Rankin plant (third order from United States Steel Corporation and second order from American Steel & Wire Co.); Quincy Market Cold Storage & Warehouse Co., Boston, Mass., for Richmond street plant.

F. R. Wadleigh, for 12 years Chief Inspector and Fuel Engineer for Castner, Curran & Bullitt, Philadelphia, Pa., sole agents C. C. B. Pocahontas coal, has been appointed Assistant General Manager of the Chesapeake & Ohio Coal & Coke Co., with headquarters in New York. Mr. Wadleigh will act as Chief Inspector and Fuel Engineer for this company, and will have charge of the inspection, preparation and use of its coal, as well as any matters in connection with the selling and placing of its coals that may be assigned to him by the President.

The Foundry & Manufacturers' Supply Association will hold its 1909 convention and exhibit during the week of May 17, in Cincinnati, Ohio. It will be, as usual, in conjunction with the meeting of the American Foundrymen's Association. There will be an executive meeting of the former association in Cincinnati on February 5, to complete arrangements for exhibition buildings and to prepare a plan for awarding space to exhibitors. Previous to that time no space will be assigned. It is probable that the exhibits will be in Horticulture Hall. C. E. Hoyt, Chicago, is Secretary.

The Grip Nut Co., Chicago, has recently received contracts whereby Grip nuts are to be used in the construction of the 500 ventilated fruit and vegetable cars and 200 stock cars, now being built by the American Car & Foundry Co., at Madison, Ill., for the San Antonio & Aransas Pass; also for the 800 steel hopper cars to be built by the Standard Steel Car Co. for the Duluth & Iron Range. The plant of the Grip Nut Co. at South Whitley, Ind., is being enlarged in order to meet the demands of its business. The sale of Grip nuts for last week exceeded 500,000, the orders having come from various parts of the country.

At a meeting of a number of railway supply men in New York city last week, it was decided to reorganize the old, but not forgotten, "Hod Carriers' Union." This company was notorious for its many mysterious dealings in connection with a number of the annual conventions of the Master Car Builders' and American Railway Master Mechanics' Associations. It is expected by those at present interested otherwise than financially in the reorganization, that active operations will begin at a new "plant" in Atlantic City about the time of this year's conventions. J. M. McCarthy is President and Frank A. Barbey is Vice-President and Treasurer. Those interested in investing or wanting further particulars should address Mr. Barbey at 230 South Terminal Station, Boston, Mass.

TRADE PUBLICATIONS.

Denver & Rio Grande.—"The Lands of Taos" is the title of an attractive catalogue, well illustrated with views of the country in and surrounding the Taos Valley, New Mexico. Additional information as to special rates to homeseekers, etc., may be obtained from the Denver & Rio Grande Railroad.

Car Interchange Manual.—The McConway & Torley Co., Pittsburgh, Pa., has issued a supplement to its handy little pocket manual which gives a complete epitome of the cases decided by the arbitration committee of the Master Car Builders' Association. Anybody interested can get a copy of the manual, with the supplement, by writing to the publishers.

Steel Tubes.—The National Tube Co., Pittsburgh, Pa., has just issued a very attractive and complete catalogue on the subject of Shelby steel tubes and their making. The catalogue is fully illustrated with half-tones showing the different processes of the manufacture of these tubes. This booklet is not for general distribution but will be sent to those who are particularly interested.

Steamer Commonwealth.—The passenger department of the Fall River Line of the New York, New Haven & Hartford has recently issued an artistic booklet which describes the new $2,000,000 steamer Commonwealth. A number of illustrations show various parts of the interior of the vessel. The steamer Commonwealth was described in the *Railroad Age Gazette* of July 3, 1908.

The Electrical Show at Chicago.

The fourth annual electrical show, under the management of the Electrical Trades Exposition Co., is now in its second and last week at the Coliseum, Chicago. This show has become one of the most popular large trade shows in the country, and this year's has eclipsed its predecessors.

The exhibition booths have been arranged by the management in a uniform style and all available space is occupied. The decorative scheme has been well devised. Each booth is lighted by a number of tungsten, instead of the ordinary carbon-filament, lamps and on a dark background overhead have been arranged numerous small incandescent lamps in flashing sockets, the whole being a very good imitation of a starlit sky. The number of exhibitors this year is 105. A partial list of the exhibitors includes:

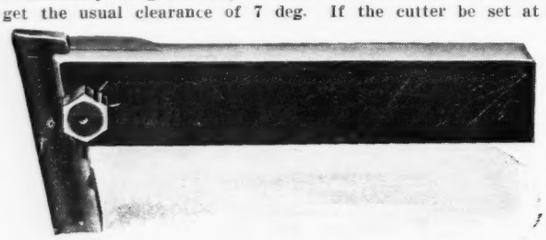
Allis-Chalmers Co., Milwaukee, Wis.
Crane Company, Chicago.
Chicago Pneumatic Tool Co., Chicago.
General Electric Co., Schenectady, N. Y.
Kellogg Switchboard & Supply Co., Chicago.
International Correspondence Schools, Scranton, Pa.
H. W. Johns-Manville Co., New York.
Stromberg-Carlson Telephone Manufacturing Co., Rochester, N. Y.
Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa.
Western Electric Co., Chicago.

Lang Tool Holder.

The accompanying illustration shows a 2-in. x 3-in. x 16-in. inserted tool holder, designed especially for use in turning locomotive tires. The holder is said to have the rigidity, backing and radiating surface of a solid tool. While it is not intended for use on all classes of work, it is particularly useful on plain work in a lathe, vertical mill, planer or pony wheel lathe, in which cases special-sized shanks can be furnished. It is claimed that a tool used with this holder will withstand a ⅝-in. cut with a ¼-in. feed at a speed of from 10 to 15 ft. per min., working on a 72-in. worn locomotive driver tire.

The method of holding these cutters will be understood by reference to the accompanying cut, the lower part of the tool proper showing the notches for meshing with the bolt which clamps the two dove-tailed jaws of the holders upon the tool. The regular cut-

ters are of drop-forged high-speed steel, and the points are air hardened and ground. The cutters are 7 in. long and 2 in. across the flat, set in the holder at an angle to give 10 deg. front and side clearance. This permits grinding on the face as well as the top, and it is necessary to grind only a short distance down from the top to get the usual clearance of 7 deg. If the cutter be set at this



Lang Tool Holder.

latter angle, it would necessitate more grinding. Cutters may be used with this holder when even less than 3 in. long.

To remove the cutter for grinding or to adjust it to another notch it is not necessary to remove the bolt from the holder, merely to loosen the nut and turn the bolt one-quarter revolution, when the cutter can be slipped out. Shops using these holders can make their own cutters, which permits of their being able to use their standard grade of tool steel as well as use up all the short pieces to a good advantage. The correct shapes for inserting in these holders are easily forged by using a form.

The holder, made by the G. R. Lang Co., Meadville, Pa., is said to be of steel of over 100,000 lbs. tensile strength, oil hardened. The holders are made for right and left-hand feeds.

Charcoal Iron Boiler Tubes.

The statement is said to have been made that at the present time there is no charcoal iron being used in the manufacture of boiler tubes, but that the material used is a mixture of steel and iron scrap, such as would result from a busheling operation, where the heated and unmelted charge is simply welded together.

Of the tube mills possessing their own sources of supply in the shape of forge fires owned by themselves, are the Parkesburg Iron Co., Parkesburg, Pa.; Worth Bros. Co., Coatesville, Pa., and Tyler Tube and Pipe Co., Washington, Pa. Of the other mills producing charcoal iron tubes, Spang, Chalfant & Co., Pittsburgh, Pa.; Reading Iron Co., Reading, Pa., and Reliance Tube Co., Pittsburgh, Pa., are said to be able to secure, from trustworthy sources, either charcoal iron blooms or skelp for tubes rolled from these blooms. The modern charcoal iron forge is in principle a duplicate of the old, while in practice the only change is a more careful inspection of the finished product and a more careful selection of the charge, due to the fact that any stock containing elements detrimental to the finished blooms can be eliminated by chemical analysis.

The charge consists, as in the past, of run out metal, which is pig from which the silicon has been oxidized, or of clean finely divided wrought and steel scrap. The present forge consists of flat cast plates arranged rectangularly, as was the case in old forges, having the same relative positions to one another, and even the same names. For example, the Merritt, which is said to be known to every forgeman, is placed over the tuyere, which latter must be adjusted to the correct angle to allow the blast to work most effectually. The forgemen themselves are said to have either been working along the same lines for 30 years or have followed the former methods and manners. The unit by which they are paid, the bloom ton of 2,464 lbs., is now as it was formerly.

As to the process of manufacture, the operation of sinking the charge into a bloom consists of feeding the stock, with the charcoal, into the fire, where through the action of the blast the metal is melted and sinks to the hearth. A basic slag is produced, the carbon, silicon and manganese are practically eliminated and the sulphur and phosphorus very largely reduced. The metal, in the form of drops, encased in cinder filaments, is "brought to nature" by the reducing flame, as in the puddling process, and collects into a ball of pure fibrous iron subdivided by a network of cinder. This is then shingled under the hammer into a bloom of pure charcoal iron.

The length of service of boiler tubes made from this material, due to their non-corrosive qualities, has, it is said, enabled them to meet the competition of cheaper steel and should make them particularly efficient where quality is considered.

Steel Underframe Box Cars for Argentine.

The Ferro Carril Central de Buenos Aires is one of the several properties centering in Buenos Aires which have been developed by Miguel Lacroze, a capitalist, now living in London. Most of the Lacroze lines are electric railways, but both steam and electric properties are of a character which compare favorably with roads of similar mileage in the United States. The rolling stock in particular is thoroughly modern, as is indicated by the thirty-ton, 30-ft. steel underframe box car illustrated and described herewith, 50 of which have just been completed and shipped by The J. G. Brill Co., Philadelphia, Pa., on an order placed through J. G. White & Co., New York.

The underframe used for the cars is of the structural type and well adapted for a country where the necessary standard shapes could be quickly obtained for repairs. The center sills are 15-in. channels, spaced 14 in. apart. The side-sills are 10-in. channels, the end sills 12-in. channels and the intermediate crossings 8-in. channels. The bolsters and needle beam are built up of plates and angles. Two ¼-in. plates, 14 in. deep at the center and 10 in. deep at the side sills, are used for the bolsters. These are reinforced with 3-in. x 3-in. x ¼-in. angles at the edges. Six-in. angles are used to tie the bolsters to the side sills. The needle beam is of similar construction, though a single plate and lighter angles are used.

The body framing of the cars is almost entirely of oak. The corner posts are 2½ in. x 5 in.; side posts, 2½ in. x 5 in.; inside top plate, 3⅜ in. x 7½ in.; outside top plate, 1¾ in. x 6½ in.; rafters, 1¾ in. thick, and diagonal body braces, 2½ in. x 5 in. The roof purlins are of yellow pine 1½ in. x 3 in., and ⅞ in. x 5 in. yellow pine side sheathing, as well as 1¾-in. yellow pine flooring, is used. The lining, running to the waist rail, is of ⅞-in. tongue-and-grooved yellow sheathing.

The trucks are the Brill company's standard for freight car use,

Brill Steel Underframe Box Cars for Argentine.

of the diamond arch bar type with a steel bolster built of channels and plates. The truck wheel base is 5 ft. 6 in. and the truck centers, 19 ft. 1 in. The principal dimensions of these cars are:

Length, over body	29 ft.	7 in.
Length, inside	28 "	10½ in.
Width, inside	7 "	7½ "
Width, over body	8 "	4 "
Height from track to top of floor	3 "	11¼ "
" from top of floor to top of roof	7 "	4 7/16 "
" from track to top of roof	11 "	3 11/16 "
Center to center of trucks	19 "	1 "

Pond Sash Operating Device.

The illustrations herewith show the Pond sash operating device, designed for opening and closing adjoining window sashes, and which may be used over distances up to 2,000 lin. ft.

Fig. 1 shows this device controlling the sash of a clearstory, all the sashes of which are in one line and operated by one gear. The

Fig. 1—Pond Operating Device in Clearstory.

exclusive feature of this device is that the power is transmitted by tension to two flexible rods or cables to a double series of arms hinged at the sides of the windows, these arms being connected by rods to each side of the sash. The transmission rods are operated by a phosphor bronze gear of the worm and segment, and the gears are immersed in oil. At the opposite end of the line of sash a loose pulley or trans-

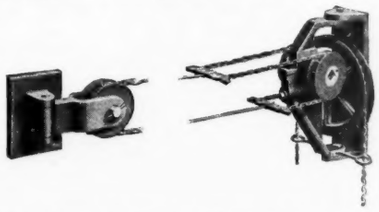


Fig. 2—Loose Pulley or Transmission Bracket.

mission bracket is located, as shown in Fig. 2. The tension transmission makes it possible to operate a line of considerable length, and where there are more than one line of sash, the additional lines may be connected together and all of the sash on one side of the building operated as shown in Fig. 3, which shows the conditions existing

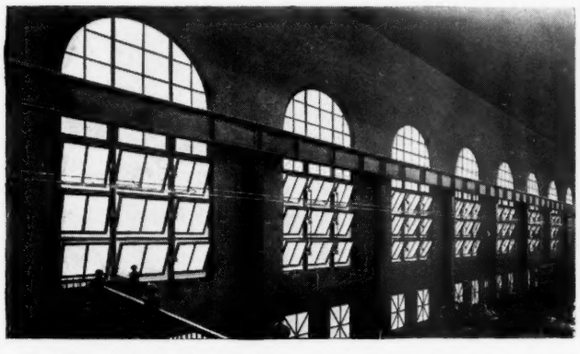


Fig. 3—Pond Operating Device In Dynamo Room of Power House.

in the dynamo room of the power house of the Union Terminal, Washington, D. C., D. H. Burnham & Co., Architects. This installation has ninety-nine sash in three different lines, each 200 ft. long, making a total of 1,100 sq. ft. of area operated from one station with a 15-lbs. load on the operating chain.

There is said to be no torsion in the Pond operating device and that the leverage is favorable at the peak load, as when the sash are perpendicular and in contact with the frame. The working conditions are made permanent by the use of phosphor bronze bearings and immersed gears. Ventilation is secured without draught by opening all of the windows the distance required to properly ventilate the building.

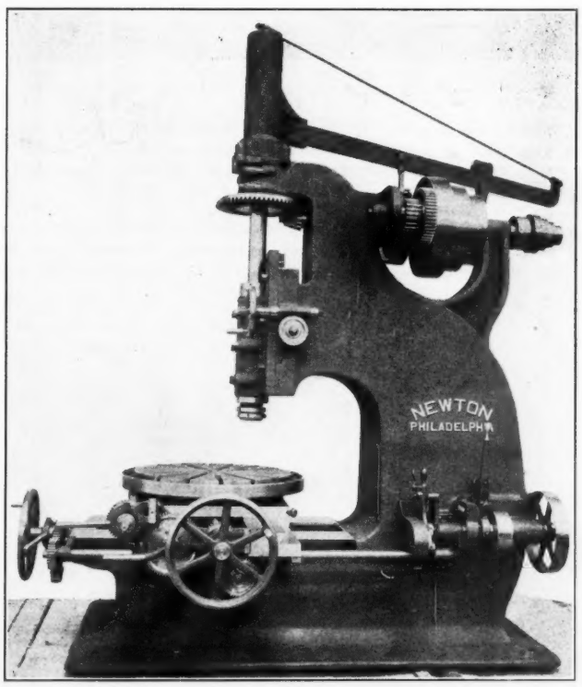
The Pond operating device is patented by Clarke P. Pond and manufactured exclusively by David Lupton's Sons Co., Philadelphia, Pa.

H-O Pipe Joint Cement.

The H. W. Johns-Manville Co., New York, has recently placed on the market its H-O pipe joint cement. As this cement is put up in powder form it can be kept in stock without drying out or deteriorating. For use, the cement is mixed with either water or linseed oil. The chemical properties of H-O cement are said to be such that it expands after the joint is made, thereby insuring a tight joint. It is claimed that the joint can be easily broken without danger of injuring the fittings. It is claimed that one pound of this cement when mixed with water is equivalent to four pounds of the ordinary ready mixed cements.

Newton No. 3 Vertical Milling Machine.

The vertical milling machine of the type here illustrated is specially adapted to finishing locomotive side and main rods, eccentric rods and various parts of the link motion and Walschaerts valve gear. The circular table and deep gap admit a wide swing in finishing long rods. With a horizontal cutter head it is also useful in



Newton Vertical Milling Machine.

finishing the flat surface of castings, and, it is claimed, will complete steam chest joints more rapidly than the planer.

The cut illustrates a new design of the No. 3 vertical milling machine made by the Newton Machine Tool Works, Philadelphia, Pa. It has reversing power feeds and fast traverse for the in and out, cross and circular motions. The table is 36 in. in diameter, entirely surrounded by an oil pan. It has in and out feeds of 26 in. and cross feeds of 30 in. The drive to the spindle is through a 3-step cone, giving a ratio when geared direct of 4.28 to 1, and when driving through the back gears of 11 to 1. The spindle is 4½ in. in diameter and has a hand vertical adjustment by gear and rack from a minimum distance of 3 in. from bottom of spindle to top of work table to a maximum distance of 18 in. The feed motion is carried to the rear side of the machine and transmitted to the worm and worm wheel, to which are connected tumbler gears by which

the reversing feed motion is controlled. The spline shaft for the circular movement and the screws for the cross and in and out adjustment have clutches to the feed which can be engaged or disengaged by the levers shown without removing any gears. A swinging crane, as illustrated, is furnished to support the outer end of rods or similar work.

Drilling Square Holes.

The accompanying illustrations show a chuck for drilling square and angular holes in steel, iron, copper, brass or other materials. This device can be applied to any ordinary milling machine, lathe or drill press without requiring any change in the machines. The principle on which the tool operates is the combination of a specially

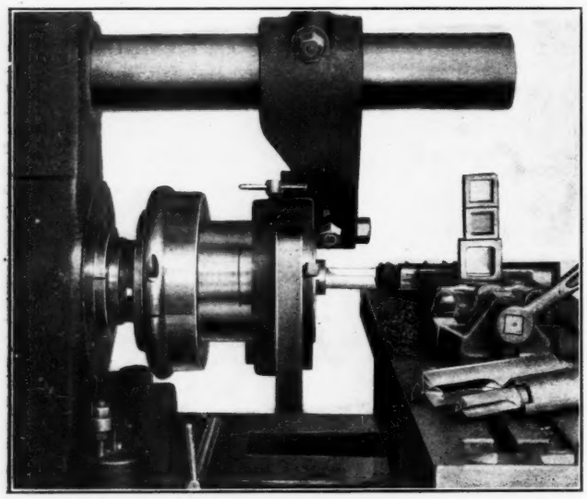


Fig. 1—Chuck as Attached to Milling Machine.

shaped drill turning in an adjustable guide formed in accordance with the shape of the drill. The drill continually changes its position with respect to the center axis of the spindle to which the chuck is attached and the cutting edges of the drill follow a course coinciding with the form of the hole presented by the guide. The apparatus consists of the two parts, B and D, fitted together by nut-ring C and the plate A, which is screwed on the spindle of the machine and fastened to the turning part D by countersunk head bolts. In the end of the part B is a small eccentric plate G, into which the drill is screwed and which gives the drill its motion.

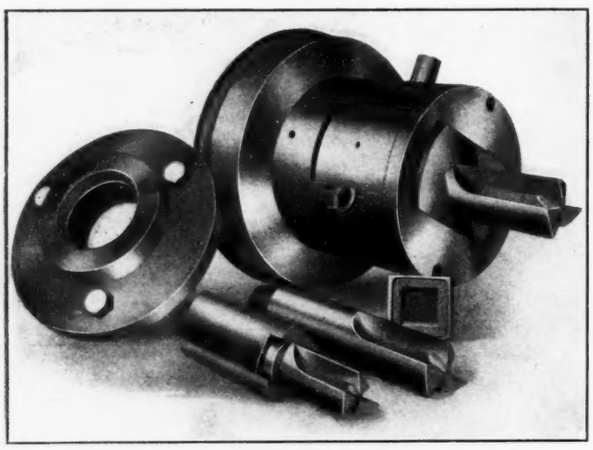


Fig. 2—Near View of Chuck, Showing Drill In Position.

As D revolves, this plate G has a cam action. The small circular plate H serves as a filler piece between the end of the drill and the bearing edges of B. D is the part which is held stationary and in which the adjustable guide is fitted. C is a nut screw which holds B and D tightly together.

The method of working is largely a milling process, owing to the shape of the drill, the undersides of which are sharpened similar to a cutter, while the lateral cutting surfaces are hollowed out. This has the advantage that grinding can be easily and rapidly performed on any grinding mill. Fig. 1 shows the chuck in position attached to a milling machine. The method of holding the rigid part D of Fig. 3 is clearly illustrated. Fig. 2 is a near view of the chuck, showing in place the drill for sharp-cornered holes. It appears from this photograph that the jaws of the chuck clamp the drill shank rigidly, but this is not the case, as the jaws merely present the square guide which gives the cutting edges of the drill their proper motion. The outline drawings, Fig. 4, are given to show the method of obtaining a hole with sharp or rounded corners. The drill shown in section in both cases is of the same size. The left-hand drawing shows the drill as used in making the sharp-cornered hole. The outline *e* is the guide presented by the chuck jaws. The sleeve

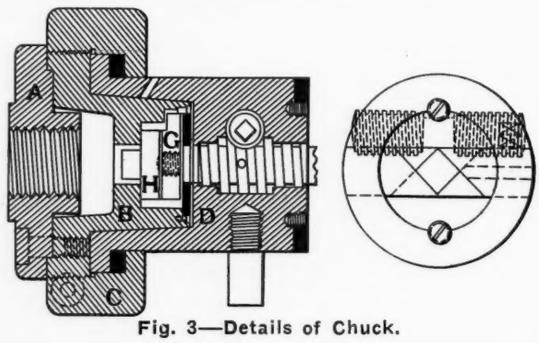


Fig. 3—Details of Chuck.

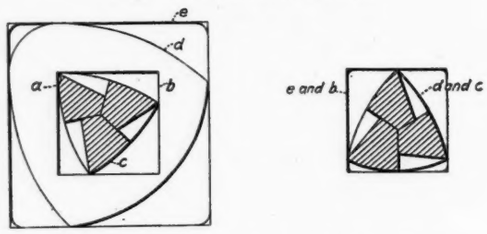


Fig. 4—Diagrams Illustrating Action of Drill.

is shown as *d*. It will be noticed that the one rounded corner of this sleeve is opposite the point *a* of the drill. It is this curved surface which is always opposite the finishing edge of the drill, the other two edges making the roughing cuts. The hole being drilled is shown in outline as *b*, and *c* is the drill itself. In the right-hand drawing the hole has rounded corners and the guiding faces of the chuck *e* and those of the drilled hole *b* coincide, shown as *e and b*. Similarly, the faces of the sleeve *d* and those of the drill *c* coincide, or, as will be noted by reference to the drill shown in place in Fig. 2, the surfaces of the drill shank for round-cornered holes act as the guiding surfaces. Fig. 5 shows the drill for sharp-cornered holes with a sleeve which provides the guiding surfaces.

The square hole drilled with this device will have perfectly straight,

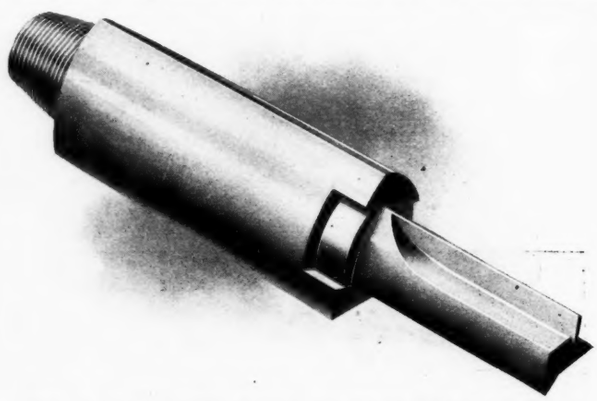


Fig. 5—Drill, with Sleeve, for Sharp Cornered Holes.

perpendicular sides only when the drill is properly ground, and a special attachment, which holds the drill shank in a V-block and at the proper angle, has been provided to meet this requirement. It is not necessary to use the heavy clamping arrangement shown in Fig. 1, but a stop bar may be screwed into the chuck as shown in Fig. 3.

The Radical Angular Drill Co., 114 Liberty street, New York, control the patents on this device in the United States. It is claimed that the device has been in use in Europe for several years.